

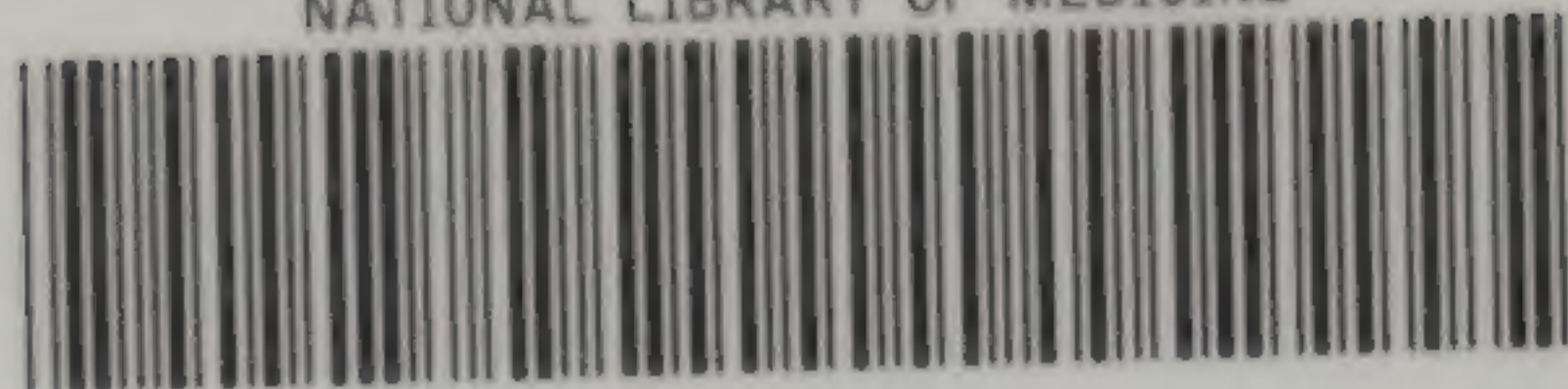
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IN THE JEFFERSON MEDICAL COLLEGE, PHILADELPHIA, ETC.

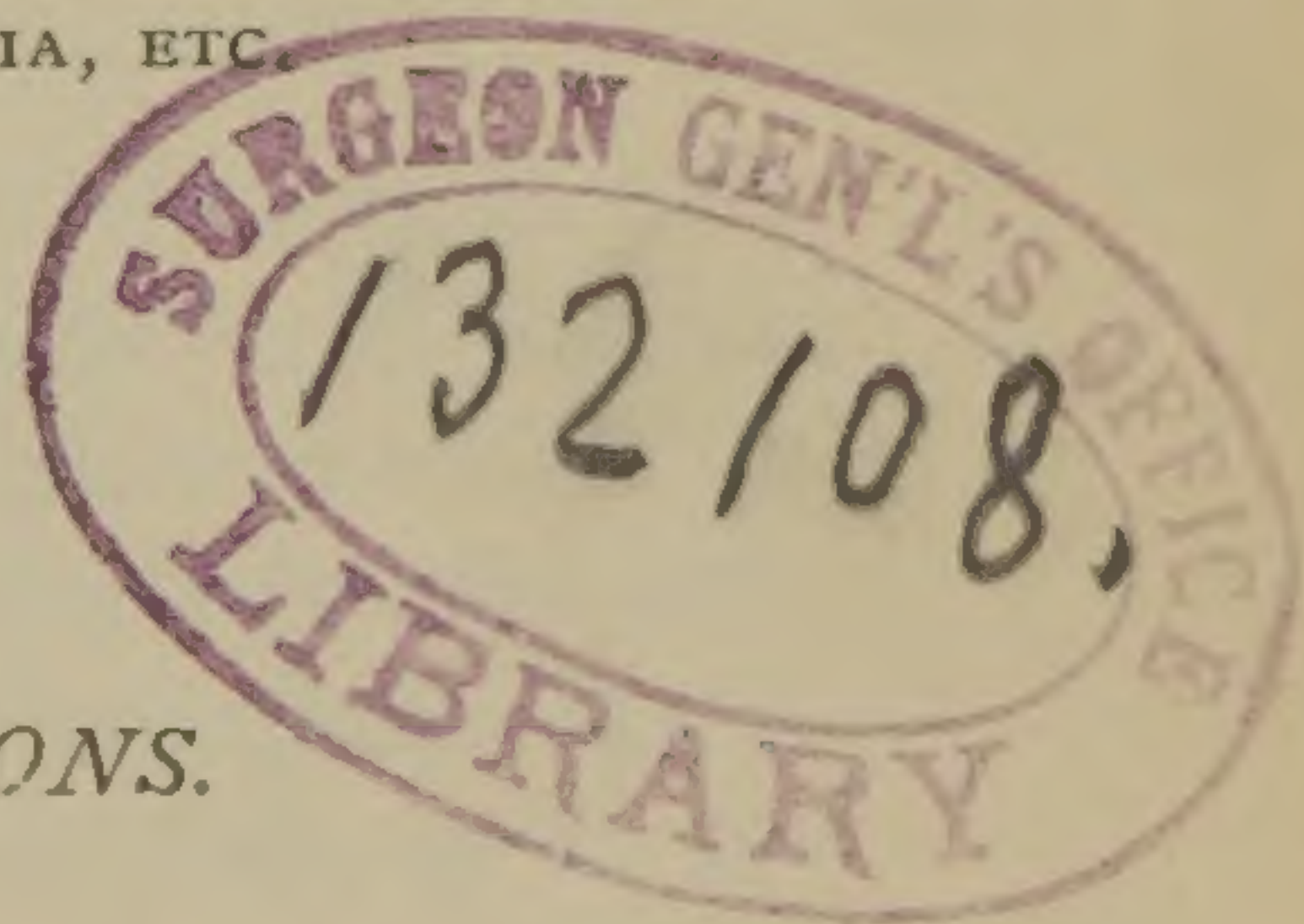
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PREFACE.

This little book is written to redeem a promise, too long delayed in its fulfillment, which was made by the author to his students and to the publishers some years ago, when he was Demonstrator of Obstetrics and Gynæcology in the Jefferson Medical College of Philadelphia, and consists to a great extent of the course of instruction which he then gave in the laboratory of the College. He has endeavored to make the portion of the work which deals with "Gynæcological Examinations" as practical as possible, in the hope that it may prove useful to the beginner, and to the physician who from want of constant practice in gynæcology, may, when called upon to make an examination, be at a loss as to the best methods of procedure, or puzzled as to the significance of what is found. The latter portion of the book is intended as an epitome of the diseases of women rather than a treatise on the subject, and it is hoped may be of use to the student.

He would acknowledge his indebtedness to such standard books on gynæcology as those of Skene, Emmet, Goodell, Thomas, Duncan, Hart and Barbour, etc.

Due credit has been given for the illustrations, whenever it could be ascertained to whom the credit was due, and several original cuts have been introduced. The author also wishes to thank his friend, Dr. John M. Eager, who kindly prepared the Index for him, and in conclusion, would be glad to receive any criticisms, favorable or the reverse, which may be forwarded to him, or to his publishers.

*313 S. 16th St., Philadelphia,
December, 1890.*

HENRY MORRIS.

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OF

GYNÆCOLOGY.

The word **Gynæcology** * (from γυνή, a woman, and λόγος, a discourse) means the doctrine of the nature and diseases of women. A knowledge of the diseases of the female presupposes an intimate acquaintance with the anatomy of the individual organs peculiar to her, and the relation which they bear to each other under different circumstances. It is essential, also, to comprehend thoroughly the physiological functions of these organs, in order to understand the significance of their actions when perverted by disease. A review of at least the principal anatomical facts seems therefore indispensable, even in a limited work on Gynæcology, such as is the present.

ANATOMY OF THE FEMALE SEXUAL ORGANS.

The female sexual organs are divided into the organs of generation and the organs of lactation. The diseases of the organs of lactation are usually considered in books on Obstetrics and on Surgery, and will not be further mentioned in the present work.

THE ORGANS OF GENERATION

Are divided into the *external* (those organs external to the pelvis), and the *internal organs* (those contained in the cavity of the pelvis).

* This word is variously pronounced *jī-ne-kōl'-o-ge* (Fulton and Knight), *gīn-e-kōl'-o-ge* (Ensfield, Craig) and *jīn-e-kōl'-o-ge* (Smart). The first pronunciation is generally preferred.

(A) The external organs of generation in the female are spoken of collectively as the *pudenda* (*pudeo*, to be ashamed),

FIG. 1.



1. Right Labium Majus. 2. The Fourchette. 3. Right Labium Minus, or Nympha. 4. Glans Clitoridis. 5. Urethral Orifice. 6. Vestibule (a triangular space, the sides of the triangle formed by the nymphæ, the apex by clitoris, and the base by a transverse line, which is bisected by the urethral orifice). 7. Orifice of the Vagina. 8. The Hymen, running in this case all around the vaginal orifice, but still broader posteriorly. 9. Orifice of the duct of Bartholin's Gland on the right side; this is represented too far forward, it should be about as far back as the posterior 3 in the figure. 10. Mons Veneris. 11. Anal orifice. (*Thorburne*).

i. e., the parts which a woman is ashamed to expose, and consist of the *mons veneris* and the *vulva* (those external organs situated between the thighs of a woman) which includes the *labia majora and minora*, *clitoris*, *vestibule* and *meatus urinarius*, *hymen* and *carunculæ myrtiformis*, *fourchette* and *fossa navicularis*, *vulvo-vaginal glands* and *perinæum*.

(a) The *mons veneris* is an elevation of the integument situated upon and above the pubes. It consists of a thick layer of adipose and connective tissues, interspersed with elastic filaments and muscular fibres derived from the round ligament of the uterus, and is covered with skin in which numerous sebaceous follicles are found. After puberty a more or less profuse growth of hair takes place, covering the *mons veneris*.

(b) The *labia majora* are two folds of skin enclosing dartos, adipose and connective tissues, with a few muscular fibres derived from the round ligament of the uterus, and are placed on either side of the *genital fissure*. They are covered externally, especially above, by a profuse growth of hair, and contain numerous sebaceous and sudoriferous

glands. Above they unite just below the *mons veneris*, while posteriorly they blend with the *perinæum*.

(c) *The labia minora* or *nymphæ* (from *νεμψαι*, nymphs, on account of their supposed function of directing the stream of urine, even as the water nymphs of mythology presided over the fountains and watercourses) are two folds of skin containing erectile tissue, usually of a pinkish or bright red color, situated between, and, usually in the virgin, concealed by the labia majora. They are devoid of hair, but have an abundant supply of sebaceous follicles. Anteriorly and above they end in the frenulum of the clitoris (Doran), while below they terminate near the centre of the genital fissure, by blending with the integuments of the vulva, or with the labia majora of either side.

(d) *The clitoris* (probably from *κλιτρίς* (from *κλινῶ*, to slope gently, to lie concealed), in reference to its concealed position, or to its being a very slight eminence), is a small body placed in the median line just above the genital fissure. It is the analogue of the penis in the male, and consists of two erectile bodies, the *corpora cavernosa*, which are attached to the ischio-pubic ramus of either side, and which, passing forward and upward, lie side by side in front of the pubic joint, forming the body of the clitoris, and terminating in the *glans* or head. The clitoris is attached to the pubic joint by means of its suspensory ligament, and is covered by its prepuce.

(e) *The vestibule* is the triangular space bounded by the nymphæ laterally, and by the orifice of the vagina or of the hymen below, and is studded by numerous muciparous follicles. The *meatus urinarius* is found in the lower part of the vestibule immediately in front of the vaginal orifice and in the median line. Its situation is marked by a small mucous tubercle, the *urethro-vaginal tubercle*, which can be readily felt by the examining finger, and is the guide to the introduction of the catheter.

(f) *The hymen* is a cutaneous fold, mostly developed posteriorly, partially or entirely occluding the orifice of the vagina. It is usually ruptured during the first act of copulation; and, after great stretching, as during childbirth, or after the passage of a large polyp through the vulva, it generally shrivels up, leaving several small fleshy tubercles on either side of the vaginal entrance, which are known as the *caruncule myrtiliformes*. As the hymen may be ruptured from other causes, or perhaps even be congenitally absent, while on the other hand it has been found in women after child-

birth, its presence cannot be regarded as a proof of virginity, nor should a woman be hastily condemned if it is not intact.

(*g*) *The fourchette* is the anterior termination of the perinæum, situated between the posterior ends of the labia majora, and separated from the hymen by a small depression, the *fossa navicularis*, which can scarcely be said to exist until the structures are drawn apart.

(*h*) *The vulvo-vaginal glands* (*glands of Bartholin or Duverney*) are the analogues of Cowper's glands in the male. They consist of a collection of tubules, forming an oval body about one-half an inch long, lying beneath the middle layer of the perinæal fascia, against the posterior vaginal wall on either side, and opening by a duct just in front of the hymen.

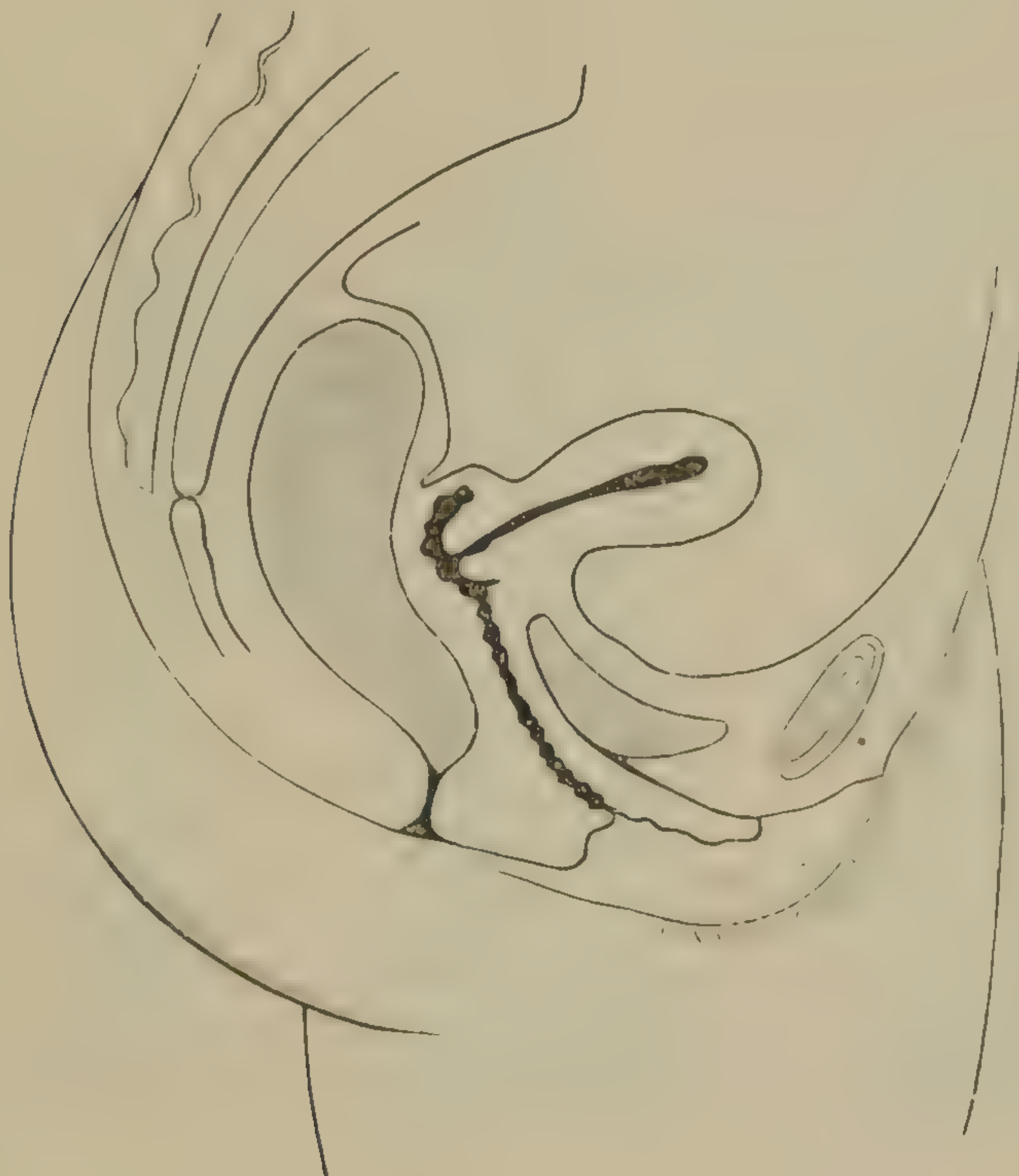
(*i*) *The perinæum* is a triangular body intervening between the anus behind and the vulva in front, extending upward for some distance between the rectum and the posterior vaginal wall, and stretching across the pelvic outlet between the ischio-pubic rami and ischial tuberosities. It consists chiefly of various muscular planes, separated from each other by the somewhat elastic layers of the perinæal fascia, and covered externally by the superficial fascia and the skin.

(*B*) **The internal organs of generation** are, the *vagina*, *uterus*, *oviducts* and *ovaries*.

(*a*) *The vagina* is a musculo-membranous flaccid tube, the anterior and posterior walls of which are in contact, being only separated when held apart by something inserted into or passing through its cavity, as during sexual intercourse or gynæcological examinations, or when it affords a passage to secretions, the menses, or the products of conception. It is continuous below with the vulva, and above with the uterus, which projects into it, as does a cork into the neck of a bottle, and to which it is attached by direct continuity of its mucous and, to some extent, of its muscular coats. The posterior wall is longer than the anterior, being inserted higher up on the uterus. The cul-de-sacs formed by the reflection of the anterior and posterior walls to the surface of the cervix, are known as the *anterior* and *posterior vaginal vaults* or *fornices*. The posterior is the more marked. The vagina is directed backward, and somewhat upward, forming an angle of about 60° with the horizon

when the woman is in the erect posture, and being almost parallel with the plane of the pelvic inlet. It is widest above, at the uterine insertion, and is narrowest at the hymen. It consists of three coats—the external or *fibrous*, derived from the pelvic and perinæal fasciæ; a middle or *muscular*, and an internal or *mucons coat*. The *muscular coat* consists of longitudinal and circular fibres, so inter-

FIG. 2.



VERTICAL SECTION OF THE PELVIC VISCERA OF AN ADULT VIRGIN.

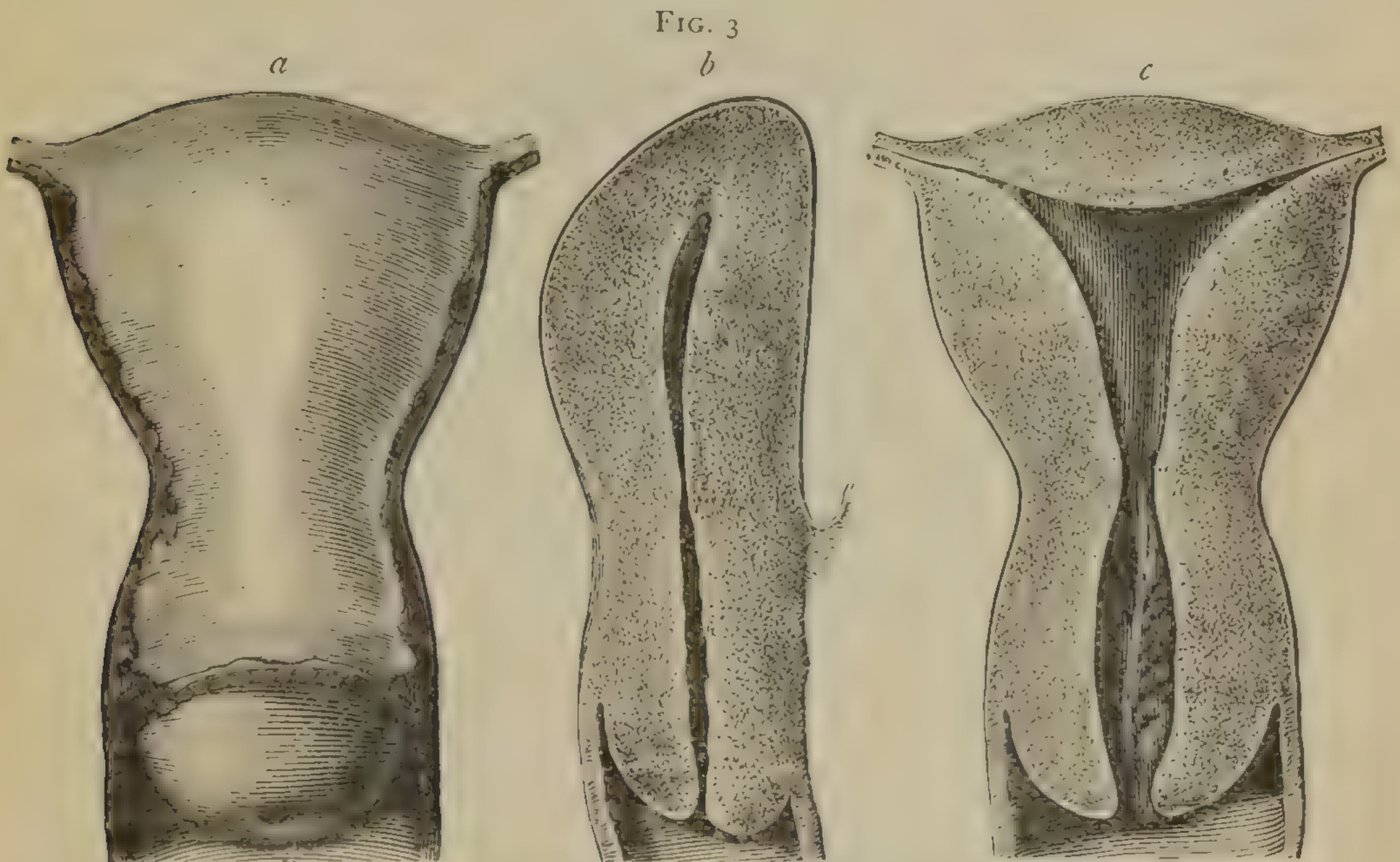
Showing the outline of the anterior and posterior vaginal walls, the position of the uterus, and the shape of the bladder when empty. (*After Foster.*)

laced that it is disputed which is external. It is also surrounded below by the sphincter and by the constrictor vaginæ muscles. The most powerful external muscle, however, is the levator ani, the anterior part of which is inserted into and surrounds the vagina, and may exert considerable compression upon it when in a state of contraction.

The *mucous coat* presents numerous transverse ridges (*rugæ*), most marked in nulliparæ and on the anterior wall, which are studded with papillæ, and are connected by a vertical thickened ridge (*anterior vaginal column*), lying on the anterior wall just below the meatus. A slight vertical ridge is also found on the posterior wall. The rugæ and columns are so arranged that they lie side by side, and are not superimposed when the anterior and posterior vaginal walls are in contact. The mucous membrane contains a few scattered glands, the nature of which is still a matter of doubt, and is covered with squamous epithelium. The external surface of the anterior wall is in relation with the urethra, the bladder and the ureters (slightly). The connection between the vagina and the urethra is exceedingly strong. The posterior wall is in relation externally with the perinæal body, the rectum (to which it is loosely attached by cellular tissue), and with that portion of the peritoneum known as Douglas's cul-de-sac, which descends for a variable distance, usually for nearly an inch, between it and the rectum. Laterally, the vaginal walls are in relation with the cellular tissue of the pelvis, and with the *bulbs of the vagina* (two small bodies composed of erectile tissue, lying on either side of the vaginal orifice and covered by the sphincter vaginæ muscle). They are the analogues of the corpus spongiosum of the male penis.

(*b*) *The uterus* is a hollow muscular organ, situated in the true pelvis, between the bladder and the rectum, varying in position with the amount of distention of those organs—especially of the former, upon which its upper portion rests—being a little below the plane of the pelvic inlet. It resembles an inverted pear in shape, and is divided externally by a constriction—the *isthmus*—into a *corpus* or *body*, and a *cervix* or *neck*. From the upper angles or *cornua* the *oviducts* pass off on either side, the top of the uterus between their attachments being known as the *fundus*, and being slightly convex in the virgin, more so in the mother of children. The anterior surface of the body is flattened, the posterior convex. The cervix projects into the vagina, which is attached higher up on its posterior than on its anterior wall, and is thus divided into two parts—the *supra-* and *intra-vaginal portions*. The adult unimpregnated uterus is about three inches in length, two and three-quarter inches in breadth at the fundus, not quite an inch in thick-

ness, and weighs about one ounce. The *cavity of the uterus* is divided by a constriction—the *internal os uteri*—into two portions, that of the body and that of the neck. The former is triangular in shape, with anterior and posterior walls which are almost in contact, and communicates above with the peritoneal cavity through the oviducts, and below with the cavity of the cervix through the internal os. The cavity of the cervix is fusiform, being dilated in centre, but narrowed above at the os internum, and below at the *os externum uteri*, through which it opens into the vagina. The



Virgin Uterus. *a.* Anterior view; *b.* Median section; *c.* Lateral section. (*Sapocy.*)

cavity of the entire uterus measures about two and one-half inches, being less than the length of the uterus by the thickness of the wall at the fundus. The uterus is composed chiefly of muscular and fibrous walls, arranged in various layers and channeled by large veins (the *uterine sinuses*) and tortuous arteries. On the outside, the portion of the anterior and posterior walls above the vagina, is covered by peritoneum, while within the cavity is lined with mucous membrane.

The *peritoneum* which lines the abdominal parietes descends

until just above the pubes, where it passes inward, covering the upper, and part of the posterior wall of the bladder, and is thence reflected to the anterior surface of the uterus at the isthmus, thus forming the *vesico-uterine pouch* and being continuous laterally with peritoneum covering the anterior part of the iliac fossæ. It then covers the anterior body-wall of the uterus, extending on either side to the pelvic walls, thus forming the *anterior layer of the broad ligament*, and investing the fundus, with the attached oviducts, it descends over the posterior uterine wall and upper part of the vagina, stretching out laterally to the pelvic walls, and forming the *posterior layer of the broad ligaments*. It is reflected on the anterior surface of the rectum, which it ascends, leaving a deep fossa between the rectum and uterus, called the *recto-uterine pouch* or *Douglas's cul-de-sac*. Thus the body of the uterus is entirely invested by peritoneum except at its sides, where, between the two layers of the peritoneum, are found connective, fibrous and muscular tissue, blood-vessels, nerves and lymphatics.

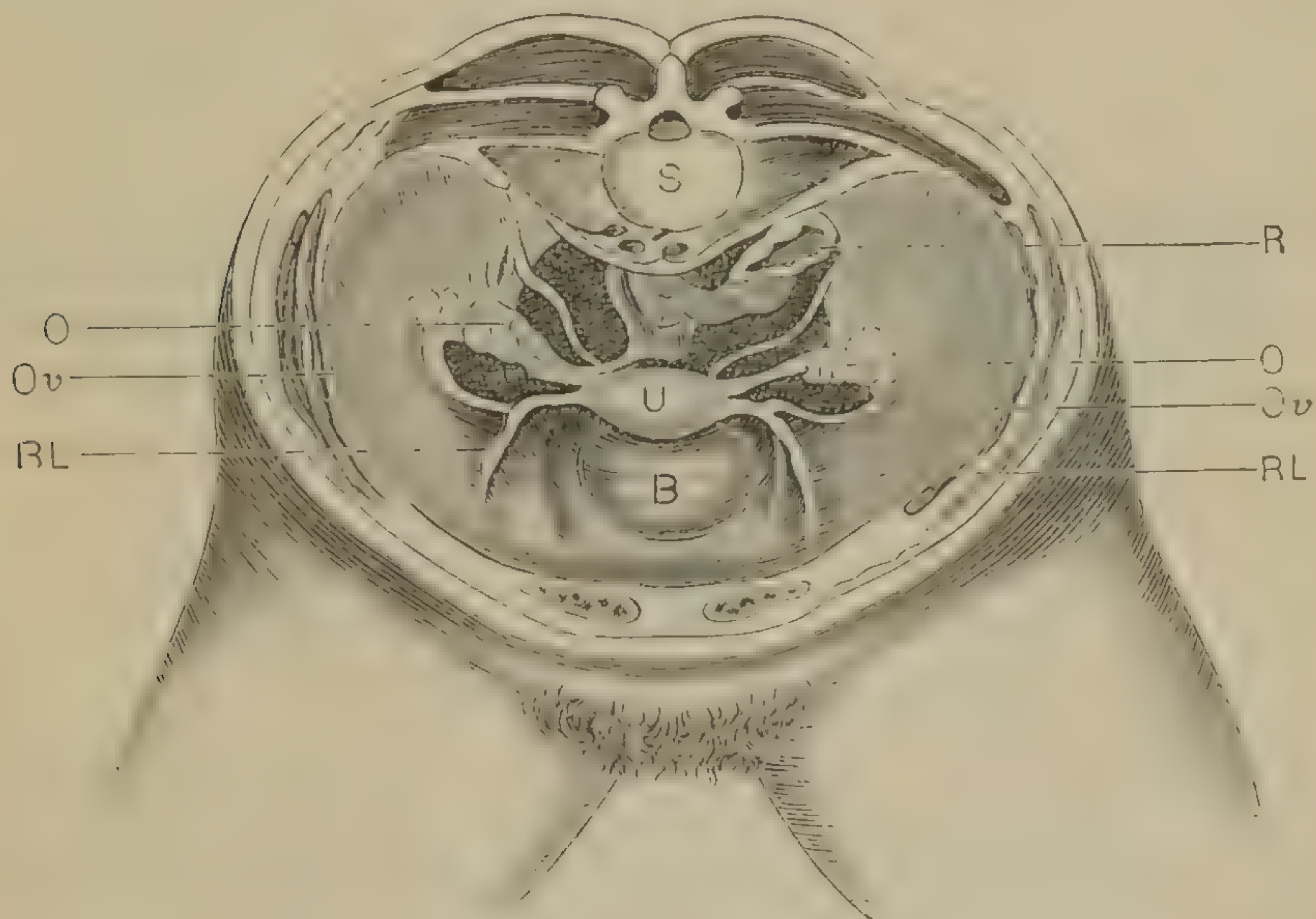
The mucous membrane lining the body of the uterus differs from that of the neck. In the former situation it is thin, smooth except at the entrance of the oviducts where a few transverse folds are seen, covered with columnar, ciliated epithelial cells, and studded with tubular glands which pass down through its whole thickness and rest on the muscular tissue beneath it. In the neck, the mucous membrane presents two longitudinal ridges, anteriorly and posteriorly, which give off numerous secondary ridges, ascending in an oblique manner, from their general resemblance to the branches of a tree, called the *arbor vitæ*, or tree of life. It is covered by columnar epithelial cells, some of which are cuboidal in shape, and which on the ridges of the *arbor vitæ* are ciliated. Numerous racemose glands are found in the cervix, which pour out a glairy, viscid secretion of alkaline reaction, and which sometimes form small retention-cysts, known as the *ovula Nabothi*. This mucous membrane ceases abruptly at the os externum, and is replaced by a mucous membrane covered with squamous epithelium, similar to that of the vagina. This covers the intravaginal portion of the cervix.

The ligaments of the uterus are composed of connective and muscular tissues derived from the uterus and invested with peritoneum.

The *broad ligaments* have already been described. They present three folds on their upper surface, the anterior of which contains the round ligament, the middle the oviduct, and the posterior the ovary.

The *round ligament* is a fibrous and muscular cord attached to the sides of the uterus, just below, and slightly in front of the entrance of the oviducts. It runs upward, outward, and forward in the anterior fold of the broad ligament to the internal abdomi-

FIG. 4.



HORIZONTAL SECTION OF ABDOMEN IMMEDIATELY ABOVE THE CRESTS OF THE ILIA.

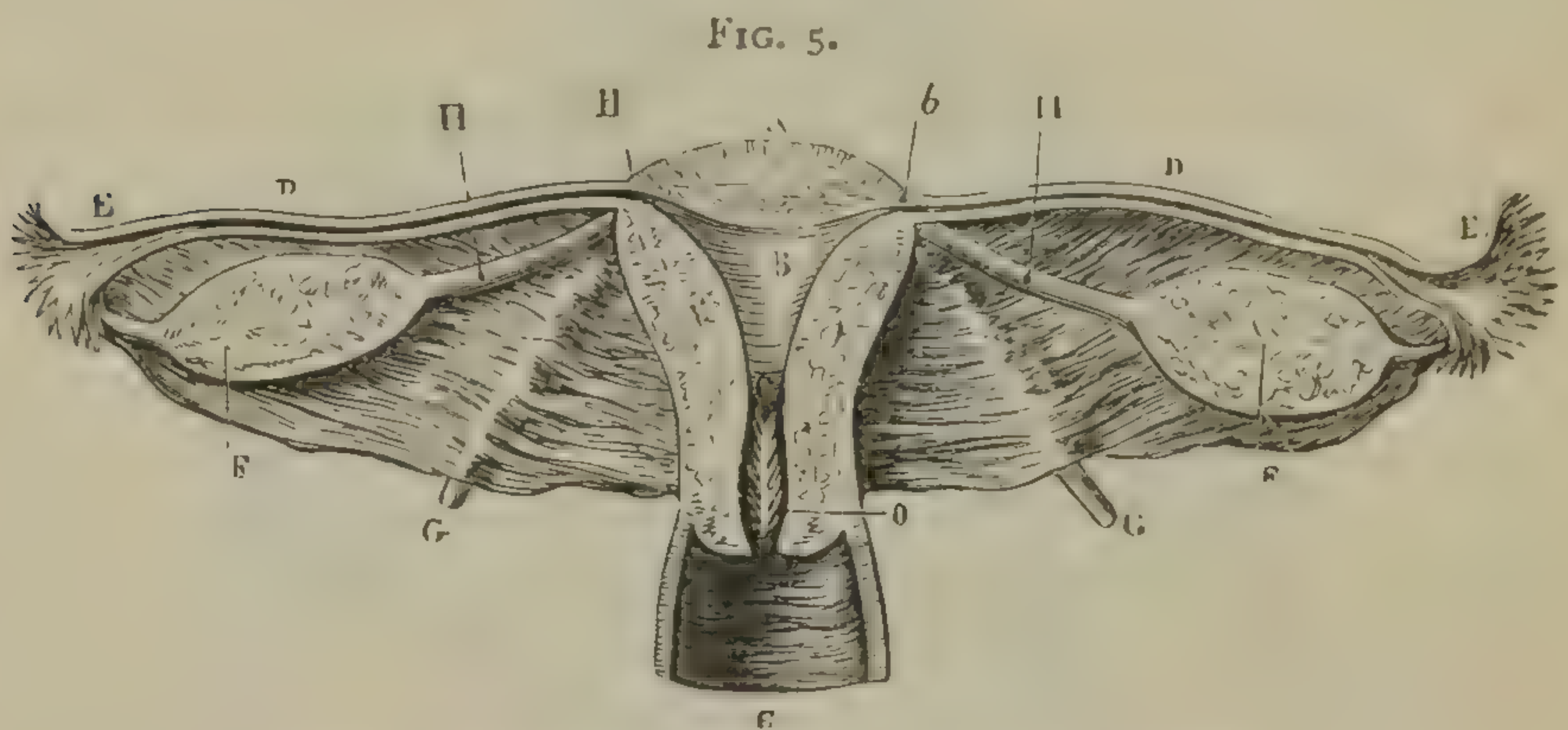
B. Fundus of Bladder. *U.* Uterine Body. *O.O.* Ovaries, with the utero-ovarian ligaments. *Ov.Ov.* Oviducts, terminating in the fimbriated extremity. *RL.RL.* Round Ligaments. *R.* Transverse section sigmoid flexure; the upper part of rectum is seen passing into the cavity of the pelvis. *S.* Upper segment of sacrum.

nal ring, enters the inguinal canal, and terminates in the mons Veneris and labium majus of either side. It carries with it a tubular prolongation of the peritoneum, which sometimes persists as a blind canal connected with the peritoneal cavity, and which is then called the "*canal of Nuck.*"

The *utero-sacral* or *recto-sacral ligaments* are two bands of muscular and fibrous tissue, passing back on either side of the isthmus posteriorly to the second or third segment of the sacrum. They

are covered with peritoneum, and bound Douglas's cul-de-sac laterally. They can be distinctly felt during a rectal examination. The *utero-vesical ligaments* are two processes of peritoneum, covering slight bands of muscular and connective tissue, passing forward from the uterus to the bladder.

(c) *The oviducts or Fallopian tubes* are two trumpet-shaped ducts leading from the upper angles of the uterine cavity outward on either side to the peritoneal cavity. They are from four to five inches in length, and are rarely equally long in the same individual. They are divided into three portions—the *isthmus*, extend-



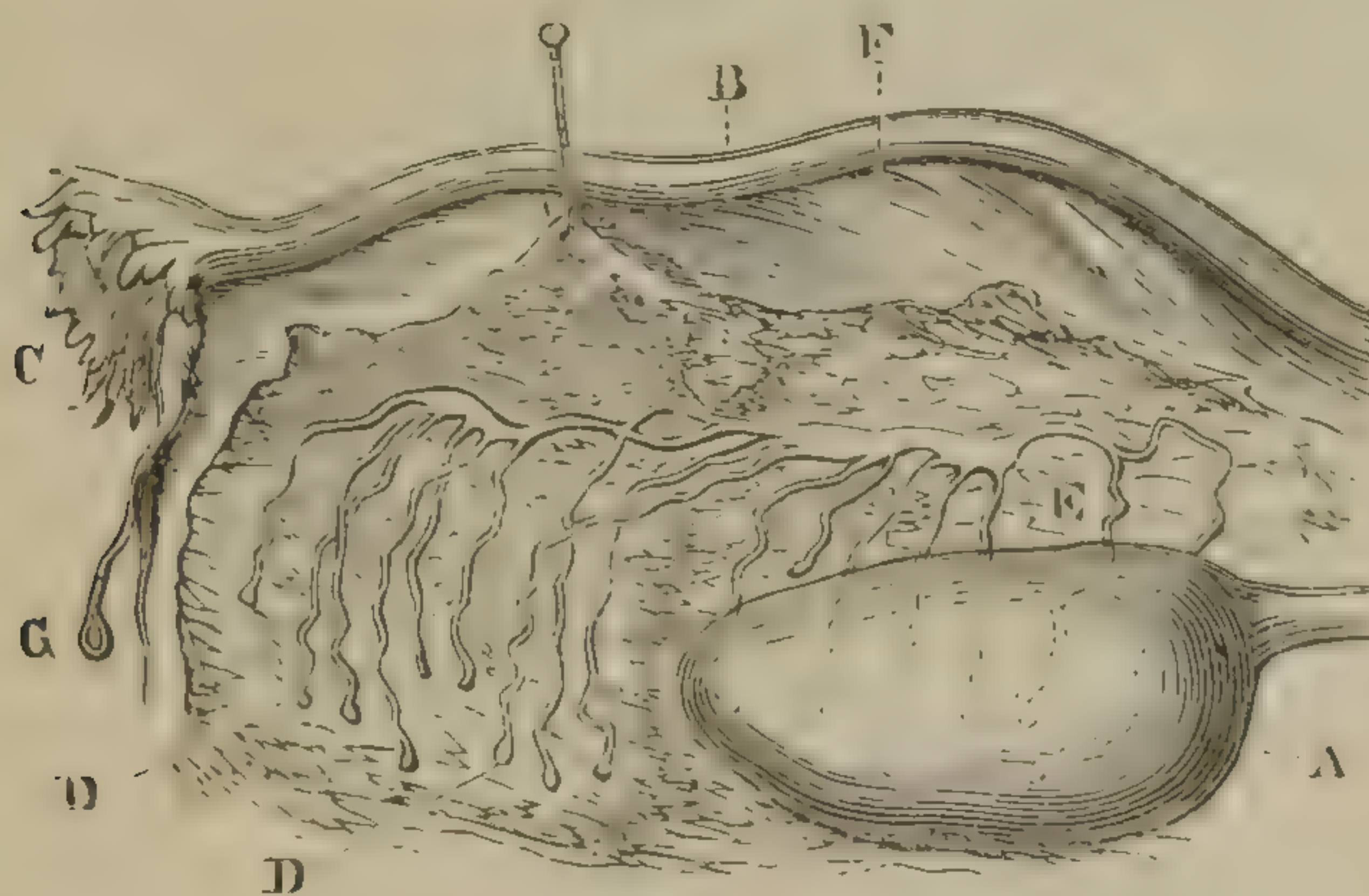
CAVITY OF THE UTERUS AND FALLOPIAN TUBES.

A. Superior border or fundus of the womb. B. Cavity of the womb. C. Cavity of the neck of the uterus. D. Canal of the Fallopian tube cut open. E. The fimbriated extremity or pavilion, likewise laid open. F.F. The ovaries, one-half of which has been removed so as to bring into view several of the Graafian vesicles. G. The cavity of the vagina. H.H. The ligaments of the ovaries. G.G. The round ligaments.

ing from the uterine cavity outward for about one inch, the straightest and narrowest part of the canal, being narrower at the uterine opening than elsewhere; the *pavilion* or *ampulla*, the dilated portion of the tube intervening between the isthmus and the outer termination; the *fimbriated extremity*, which consists of a number of finger-like or fringed processes surrounding the opening into the peritoneal cavity. One of these fimbriæ, longer than the others, is attached to the ovary and is called the *tubo-ovarian ligament*. It presents a delicate groove on its upper surface, which is supposed to aid in guiding the ovule into the opening of the extremity. The oviduct consists of a muscular coat, composed of ex-

ternal or longitudinal and internal or circular muscular fibres, which are continuous with those of the uterus. It is covered externally by a peritoneal investment, which completely surrounds it, as it passes between the two layers of the middle fold of the broad ligament. Its cavity is lined by mucous membrane, continuous with that of the body of the uterus and thrown into longitudinal folds. As it opens into the peritoneal cavity, the serous and mucous coats are in contact on the margins of the fimbriæ. The uterine opening of the canal is too small to admit of the entrance of the point of a sound during a uterine examination under ordinary circumstances,

FIG. 6.



BODIES OF ROSENMÜLLER.

A. Ovary. *B.* Fallopian tube. *C.* Fimbriated extremity of Fallopian tube. *D.* Cul-de-sac of the tubes. *E.* Canaliculi proceeding to the ovary. *F.* Points to which the tubes converge. *G.* Vesicle appended to the Fallopian tube.

but fluid forcibly injected into the uterine cavity may find its way hence into the peritoneal cavity.

(*d*) *The ovaries* are two bodies lying in the pelvic cavity on either side of the uterus and about an inch from its fundus, in the posterior fold of the broad ligament. They are ovoidal, flattened antero-posteriorly, convex above, flat below, and have been likened to an almond, both in size and shape, measuring 1.3 inch in length, $\frac{3}{4}$ of an inch in width, and about $\frac{1}{2}$ an inch in thickness. They weigh about eighty grains. They are not covered by the peritoneum, but project into its cavity, being attached to the posterior layer of the broad ligament by their lower margin, which is

known as the hilum. In a fresh ovary the line where the peritoneum is attached to the surface of the ovary can be recognized by a more or less well-marked pearly-white line. Beside the broad ligament of the uterus, the ovary is kept in place by the *utero-ovarian ligament*, which passes from the uterus between the origin of the oviducts and the round ligament on either side, and runs out between the layers of the broad ligament to the ovary of the corresponding side, being about an inch in length. The *tubo-ovarian ligament*, which has previously been described, also aids in maintaining the ovary in its position, as does the *infundibulopelvic* or *posterior round ligament*, which passes from the outer end of the oviduct to the pelvic wall.

The posterior surface of the ovary is not covered by peritoneum, but projects into the peritoneal cavity. On this surface is seen a layer of *germ epithelium* consisting of columnar cells, granular in appearance, from which the ova are formed. Under this is a layer which has been called the *tunica albuginea*, composed of spindle-shaped cells, and containing no ovisacs. Next comes a so-called *cortical layer*, containing small ovisacs, separated from each other by bundles of spindle-shaped cells with oval nuclei which constitute the stroma of the ovary, and are probably young connective tissue cells.

Beneath this cortical layer are found *ovisacs* of all sizes, imbedded in the stroma, and between this and the hilum, forming the bulk of the ovary, is the *vascular zone*, made up of connective tissue and unstriated muscular-fibres, numerous blood-vessels, nerves and lymphatics.

The *ovisacs* or *Graafian follicles* vary much in size. They are composed of a delicate external membrane, the *membrana propria*, consisting of a single layer of endothelial cells. Within this outer portion is the *membrana granulosa*, a layer of flat epithelial cells, having oval nuclei. This constitutes the ovisac, in which the ovule is imbedded, and which it at first entirely fills. As the follicle approaches maturity, it rapidly enlarges, some of the cells which form the *membrana granulosa* accumulate in a little mound, the *discus proligerus*, in which the ovule is contained, and the remainder of the cavity is filled with a clear albuminous fluid, the *liquor folliculi*.

The *ovule* consists of a mass of nucleated, nucleolated proto-

plasm, the nucleus being called the *germinal vesicle* and the nucleolus the *germinal spot*.

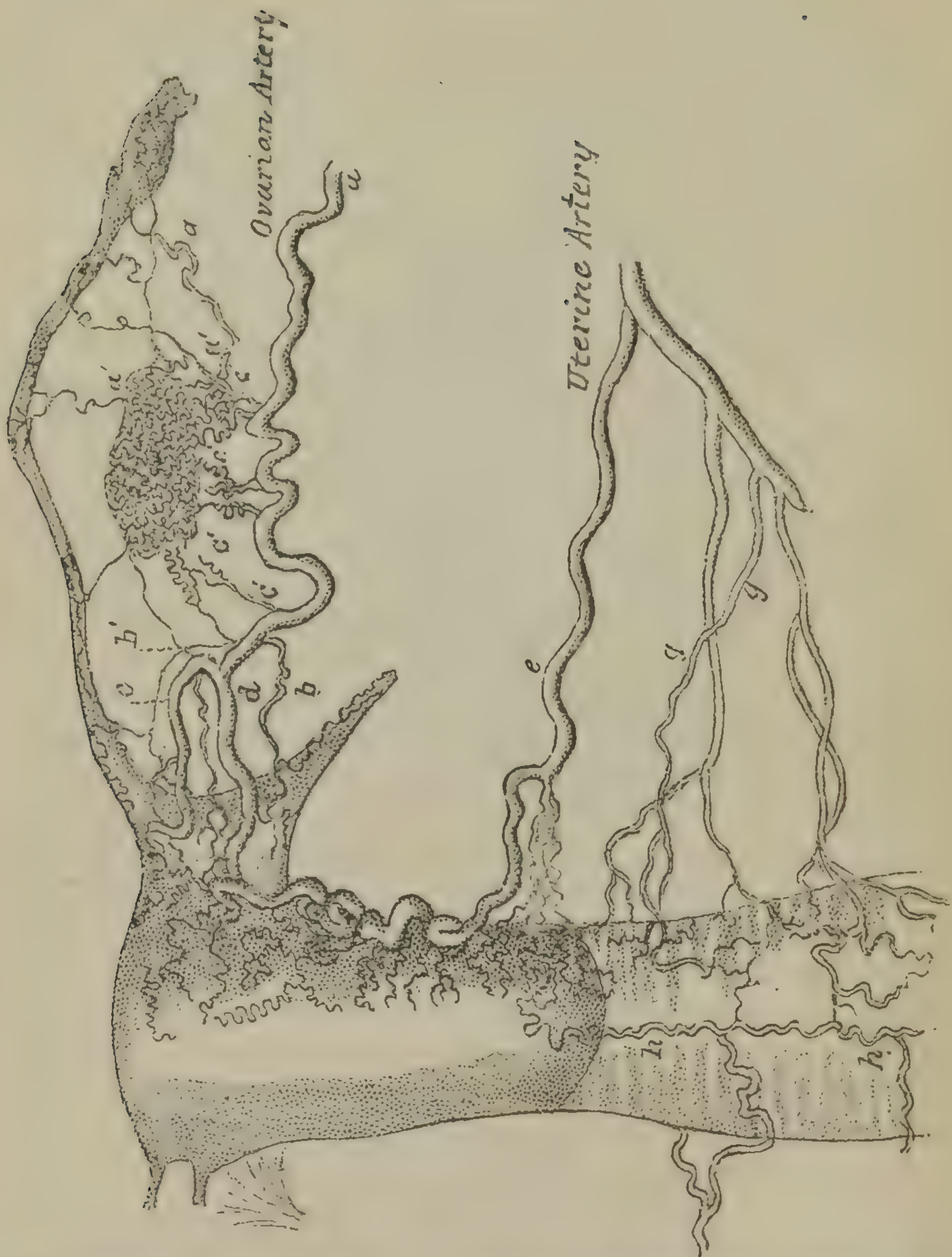
The *parovarium* or *organ of Rosenmüller* is a collection of tubes placed in the broad ligament above the ovary and between it and the oviduct. They are lined with ciliated epithelium, contain a clear fluid, and are the remains of a foetal structure. They are analogous to the epididymis of the male.

(C) *The blood-vessels* supplying the External Genitalia are similar to those which supply the analogous parts in the male. The internal genitalia are supplied from various sources. The *ovarian artery*, a branch of the abdominal aorta, passes into the pelvis, following a similar course to that pursued by the spermatic artery of the male. It then runs between the two layers of the broad ligament, lying parallel to but below the oviduct, running to the cornu of the uterus where it anastomoses with the uterine artery, having given off branches in its course to the ovary and to the oviduct. The *uterine* and *vaginal arteries* are branches of the anterior trunk of the internal iliac. The former passes downward to the neck of the uterus, and then ascends close to its side, between the layers of the broad ligament, giving off numerous tortuous branches and anastomosing near the cornu with a branch from the ovarian artery. The vaginal artery descends upon the vagina, which together with the contiguous portions of the bladder and rectum, it supplies, anastomosing freely. A small branch is frequently given off from the deep epigastric artery, which piercing the round ligament, runs in its substance to the uterus, anastomosing with the vessels just described. A branch of the uterine artery, called the *circular artery*, frequently encircles the uterine neck, and should be recollected in operations on the cervix. The *uterine* and *vaginal veins* accompany their respective arteries.

Those of the ovary, also accompany the branches of the artery, and forming a plexus, the *pampiniform plexus*, open on the right side into the inferior cava; on the left, into the left renal vein.

(D) *The nerves* of the uterus are derived from the inferior hypogastric, and ovarian plexus, and from the 3d and 4th sacral nerves: those supplying the ovary come from the ovarian plexus, chiefly, but slightly also from the inferior hypogastric plexus. The oviduct receives a twig from one of the uterine nerves.

FIG. 7.



THE ARTERIES OF THE INTERNAL FEMALE ORGANS, SEEN FROM BEHIND. (*After Hyrtl.*)

A, ovarian artery. *a' a' a'*, branches to the ampulla of the oviduct. *b*, branch to the isthmus. *c' c' c' c' c'*, branches to ovary. *b*, branch to round ligament. *c* superior, *d*, inferior divisions of the ovarian artery. *e*, the uterine artery giving off a cervical branch and running in a very tortuous manner along the side of the uterus toward the angle. *f*, internal iliac artery, giving off *g g*, vaginal arteries. *h h*, azygos artery of the vaginal, formed from the artery of the cervix and branches from the vaginal arteries of both sides.

(E) *The lymphatics* of the external genitalia correspond to those of the male, the deeper vessels accompanying the internal pudic vessels, and opening into the internal iliac glands. The lymphatics of the cervix and vagina open into the sacral and internal iliac glands, while those of the body and fundus uteri, running out between the folds of the broad ligament, receive the lymphatics of the ovaries and oviducts, and, ascending with the ovarian vessels, open into the lumbar glands.

DEVELOPMENT OF THE FEMALE SEXUAL ORGANS.

For a proper understanding of the various malformations of the genitalia, a knowledge of the development of the sexual organs is essential, but as, in a work of such limited scope as the present, a detailed description would be impossible, a brief outline only will be given, and the student referred to his text-books on Physiology and Embryology for further information on this subject.

The Intestine is at first a straight tube formed of the inner layer of the mesoblast, and lined by the hypoblast, terminating at its two extremities in blind pouches, the mouth and anus afterwards being formed by invaginations of the epiblast and absorption of the intervening tissues.

The Bladder and Urethra are formed from the intra-fœtal portion of the allantoid. The allantoid is a hollow vascular protrusion growing from the lower part of the anterior intestinal wall, and carrying the blood-vessels of the embryo to the outer wall of the ovum, forming the fœtal portion of the placenta. The intra-fœtal portion at first forms part of the *cloaca*, or common outlet of urinary, reproductive and intestinal tracts, but is afterwards separated from the intestine by the growth of the perinæum, and then forms part of the *uro-genital sinus*. Its upper portion, contracting, becomes the *urachus*, which attaches its central, dilated, portion—the *bladder*—to the umbilicus, while its lower portion, contracting also, becomes the *prostatic and membranous portion of the urethra in the male*, and the *entire urethra in the female*.

The Wolffian Bodies, or primordial kidneys appear very

early in intra-uterine life as two solid cords—one on either side—extending from just below the heart to near the posterior extremity of the embryo, and developed from the upper part of the intermediate cell mass (mesoblast) just beneath the epiblast, they sink down toward the pleuro-peritoneal cavity, and become hollow. Secreting tubules, or diverticula, spring from their inner sides, having dilated extremities, which soon become vascular and are very similar to the glomeruli of the kidneys. The ducts descend from their outer aspect and open into the uro-genital sinus. When the kidneys appear the Wolffian bodies atrophy, and can hardly be seen at the end of the third month. Their remains form *in the male* the *body* and *globus minor of the epididymis*, the *vas deferentia* and the *ejaculatory ducts*; *in the female*, the *organ of Rosenmüller*, and *Gaertner's canal*.

The Ovaries are formed as follows: The intermediate cell mass, and the peritoneum covering it, becomes thickened on the inner side of the Wolffian bodies, giving rise to an opaque ridge—the *germinal ridge*—covered with “*germ epithelium*,” which becomes the testicle or ovary, according to the sex of the embryo; if the former, the cells of the germ epithelium atrophy and the glandular structure forms from the intermediate cell mass, independently of them, while if the embryo be a female these cells increase rapidly in number and become imbedded in the surrounding mass, which develops into the stroma of the ovary, and, growing rapidly between the masses of cells, separates them from each other, thus forming islands, or nests. These nests, remaining connected with the superficial germ epithelium for some time, have the appearance of tubules, and have been called “*Pflüger's tubules*.” The cells which form these nests continue to multiply rapidly, and some becoming differentiated, develop into ova, while the others, smaller and less developed, form the *membrana granulosa* (Waldeyer). Should two or more ova develop in one nest, they will usually form a separate centre around which the smaller cells will congregate, and will finally be isolated from one another by ingrowths of the stroma. The ova are formed by the transformation of the protoplasm of the larger cells into the *vitellus*, of the nucleus into the *germinal vesicle*, and of the nucleolus into the *macula* or *germinal spot*, while the *zona pellucida* or *vitelline membrane*

results from the subsequent consolidation of the outer layer of the yolk.

The Oviducts, Uterus and Vagina are developed from furrows, which later, by the union of their edges, form canals, called *Müller's ducts*, derived, by a process of involution, from the peritoneum covering the intermediate cell mass on the outer wall of the Wolffian body of either side.

Müller's ducts lie behind and between the Wolffian ducts, and running downward with the latter to open into the uro-genital sinus, their lower extremities approximate each other, and, at a later stage of their development, coalesce, their cavities remaining separated by a septum which however finally becomes absorbed, leaving the canals divergent above for about half their length, but united in a single passage below.

In the female, the common canal thus formed becomes the *vagina*, the *cervix* and the *greater part of the body of the uterus*. The portion of the ducts immediately above this becomes the *cornua of the uterus*, while the remainder, diverging from one another form the *oviducts*. *In the male*, Müller's ducts become atrophied and form the *sinus pocularis* and the *hydatid of Morgagni*.

Incomplete union of Müller's ducts gives rise to *uterus unicornis* (one-horned uterus), where not only is there an incomplete union, but also an arrest of development of one of the ducts. *Uterus bicornis* (double-horned uterus) is due to incomplete union of the ducts, both of which however have undergone development. If the septum which separates the coalesced ducts is not absorbed, *double-uterus*, and in rare cases, *double vagina* also will result.

The ovary lies at first, in the female embryo, in the same position as does the testicle in the male, and is similarly enveloped by peritoneum and connected to the gubernaculum. This latter crosses the Müllerian duct posteriorly, and then runs, as in the male, through the inguinal canal and is lost in the tissues in front of the pubes.

It is that portion of Müller's duct which lies internally to the gubernaculum, that enters into the formation of the uterus, while that lying external to it forms the oviduct. The gubernaculum itself, becoming adherent to the point of junction of these two portions of the internal genitals, forms, in its upper part, the ligament

of the ovary, and in its lower, the round ligament of the uterus. As the ovaries descend, they pass below and behind the oviducts, which necessarily perform at the same time a movement of rotation from above downward and from before backward.

The round ligament, the oviduct, and the ovary and its ligament, become enveloped in double folds of the peritoneum, which enlarge with the growth of these organs and constitute the broad ligaments of the uterus.

The **External Genito-urinary Organs** appear a little after the internal, and are at first identical in both sexes. A rounded eminence arises below and behind the symphysis pubis, and on it appears a median groove or depression, *the genital cleft*, which growing deeper and deeper, soon opens into the *cloaca*, which has previously been formed at the junction of the lower parts of the intestinal canal and the internal genito-urinary organs. A transverse septum next appears dividing this common outlet into an anterior portion, the *uro-genital sinus*, and a posterior portion, the *anus* and *rectum*. The *uro-genital sinus* is the lowest part of the intra-fœtal portion of the allantoïd, and communicates above with the bladder. The Wolffian ducts and later the ureters and Müller's ducts open into it. As the vagina is formed and develops, it gradually contracts and becomes the urethra in the female. Two elongated eminences now appear on either side of the uro-genital opening, which converge anteriorly to form the *penis* in the male, or the *clitoris* in the female, the groove between them forming the vestibule while its elongated margins form the labia minora, but which is converted into a canal by the elongation and final union of its edges in the male, thus forming the *spongy portion of the urethra*, the prostatic and membranous portions being formed by the contracted lower part of the uro-genital sinus.

Two cutaneous appendages now appear on either side, which, in the female remain separate, as the *labia majora*, while in the male they join to form the *scrotum*, into which the testicles descend at birth.

Should the genital cleft fail to penetrate to the junction of the genito-urinary and intestinal canals, complete atresia of the vulva and rectum will result; should the transverse septum—the

perinaeum—fail to separate the anus from the uro-genital sinus, there will be a continuance of the cloaca or common outlet of these canals, as in the case of fowls.

FUNCTIONS OF THE FEMALE SEXUAL ORGANS.

The **External Genitalia** are principally of use in the generative acts (by contributing to the birth canal, and as organs of coitus). They also form part of the canal through which the menstrual and other discharges of internal organs escape. The glandular apparatus lubricates the parts by its secretions, thus preventing friction, keeping the tissues soft and pliable, and preventing excoriation from the flow of urine as it passes out from the meatus urinarius.

The **Internal Genitalia** are the organs chiefly concerned in reproduction. *The vagina* is an organ of coitus, and the canal through which the products of conception, the menstrual and other discharges, escape from the body. *The uterus* is the cavity in which the impregnated ovule is received ; in which the ovum, embryo and foetus is retained, nourished and developed until it reaches maturity, and by which it is finally expelled into the world. It also is the principal organ engaged in menstruation, which will be subsequently considered. The ovaries are the organs in which the ovules are retained until such time as they are ripe for impregnation, when they burst forth and are conveyed by the *oviducts* to the uterus.

OVULATION AND MENSTRUATION.

For the proper understanding of the disorders of menstruation, a knowledge of its causes is imperative, and as menstruation depends on ovulation, a few words regarding the latter will not be out of place.

When the ovule is about to become ripe, the irritation caused by the growing ovisac causes an active congestion of the ovary and other internal genitalia, while, at the same time, the veins are compressed by the muscular fibres of the ovary, thus producing also a passive congestion of this organ. Owing to this venous conges-

tion, fluid tends to accumulate in the cavity of the ovisac, which, by the pressure it exerts, thins the walls of the ovisac, and, by cutting off the blood supply to the overlying portion of the ovary, induces a granular and fatty degeneration of that portion, which so weakens it that finally, under the continued pressure from within, the walls and the adjacent surface of the ovary give way, and the ovule, with much of the membrana granulosa, escapes, and passing along the groove in the tubo-ovarian ligament, into which it is probably carried by the currents generated in the peritoneal fluid by the motion of the ciliæ in the oviducts, it reaches the uterus, taking from eight to twelve days to traverse the Fallopian tube. In the meantime the uterus, in preparation for the reception of a fecundated ovule, and under the stimulus of the increased blood supply, has commenced to hypertrophy in all its component parts. Thus it is larger and heavier than normal; its walls are in a state of erection; the cavity is enlarged; the mucous membrane is swollen; the os externum partly opens and the neck softens; the mucous membrane is thrown into folds, especially at the fundus and on the side corresponding to that of the ovary from which the ovule is discharged. If the ovule should not become impregnated, or should be cast off without lodging in the uterus, this hypertrophied mucous membrane, the *decidua menstrualis*, undergoes disintegration, its superficial layers desquamate, and the blood-vessels, which have been supported by this swollen mucous membrane, now give way under the increased blood pressure, their power of resistance having been lessened by the withdrawal of this support, and the menstrual flow results. Menstruation is therefore not simply the result of congestion of the uterus arising from the maturation and rupture of an ovisac and the discharge of an ovule. The afflux of blood to the uterus may take place without the rupture of any ovisac; and ova may be discharged without any afflux occurring. The presence of an ovary is, however, a necessary condition for menstruation.

Derangement of the functions of the genitalia will be considered after the means of investigating female disorders have been briefly described.

DISEASES OF WOMEN.

GYNÆCOLOGICAL EXAMINATION.

In order to arrive at a correct diagnosis of the nature of the disease from which a patient is suffering, in as short a time as possible, the physician should always examine every one presented to him, not only in a thorough, but in a systematic manner, so that every organ in turn will be interrogated, and the symptoms referable to each given their due importance in the history of the case. He should not arrive hurriedly at a diagnosis, nor form any opinion concerning the nature of the disease, until he has exhausted all the information which is attainable from the history, and by a careful physical examination of the patient.

As a departure from this plan is attended not only with great loss of time, but often with great confusion, in gynæcological, as well as in medical diagnosis, it is desirable to have a definite scheme for conducting examinations, both verbally and physically, to which the diagnostician should accustom himself, and which, if it include all the organs that may be the seat of disease, will enable him, with an unprejudiced mind, to give due prominence to each manifestation of the disease which he may meet in any particular case. It is advisable, therefore, to adhere to a definite order of examining all patients, departing from it as little as the peculiarities of the individual case will allow.

Ascertain the *name*, *age*, and *residence* of each patient; whether *married* or *single*, and, if the former, the *number of her pregnancies*, of *children* born at full time (with the respective *ages of her eldest and youngest child*); the *number of her miscarriages*, if she has had any, and the *period of pregnancy at which they have occurred*; whether they antedated or were subsequent to her last confinement, and whether any of her labors or miscarriages were attended with more than ordinary difficulty, and, if possible, the cause of the dystocia. Then learn the *nature*, *duration*, and

attributed cause of her present suffering, allowing the patient to tell her story in her own words, provided she does not wander from the point. Next it is usually advisable to interrogate her concerning her *family history*, thus discovering if there are any hereditary diseases which may have been transmitted to her. In doing this it is better not to alarm her if it is possible to prevent it, and for this reason these questions should be asked before she has made any statement which would seem to invite them. Then ascertain the *condition of her health prior to her present sickness*, and whether she had previously suffered from any similar ailment. If there is anything in her statement of her case which is not clear it is better to question her regarding it at this stage of the examination before proceeding any further. Having thus learned the general history of the patient, her sexual history next demands attention. To avoid embarrassment on the part of the woman, the physician should be entirely free from it himself, and should question her regarding her functions in an open, frank manner, as if he was accustomed to ask such questions of every patient,—as if it were a matter of course. Should he show any hesitancy in asking, the woman will inevitably become embarrassed, will not answer him freely, and will probably lose confidence in him. Beginning with her *menstrual history*, he finds out *how old* she was when her *sickness first made its appearance*; whether it has always *been regular in time, in duration and in quantity*; the *character of the flow* (free, scanty, clotted, dark, or pale), and the date *when it last appeared and ceased*. Anything morbid regarding menstruation, either in the past or present, as *amenorrhœa*, *menorrhagia*, *metrorrhagia*, or *dysmenorrhœa* (with an accurate description of the seat and character of the pains), should be carefully investigated.

Next find out if she is suffering, or has ever suffered, from any *intermenstrual discharge*, its character and quantity. Vaginal leucorrhœa is usually watery, white or clear, and of an acid reaction and smell; while uterine leucorrhœa is more often thick, tenacious and stringy, like the raw white of an egg. As most women suffer slightly from leucorrhœa for a few days before and after the menstrual period, this should not be regarded as pathological. It is occasionally necessary to inquire into the *marriage relations* of the

patient, but as a rule this is not done unless something in the history or in the physical examination renders it advisable. Ask her also in regard to any functional disturbance of the *bladder* and *rectum*, questioning her closely should any local disturbance exist; ascertain the condition of her *digestion*, *circulation*, *respiration* and *nervous system*, as these functions are often disordered in women suffering from uterine or ovarian diseases.

POSITION OF THE PATIENT.

Before studying the methods employed to arrive at the objective symptoms of a patient, it is well to understand the *positions* which the woman may occupy when undergoing examination, and the advantages and disadvantages of each of them. A patient about to undergo an examination may be placed (I) *on her back*, (II) *on her side*, (III) *on her knees*, or (IV) *she may stand* before the examiner.

(I) **The Dorsal-Recumbent Position** may be either:—

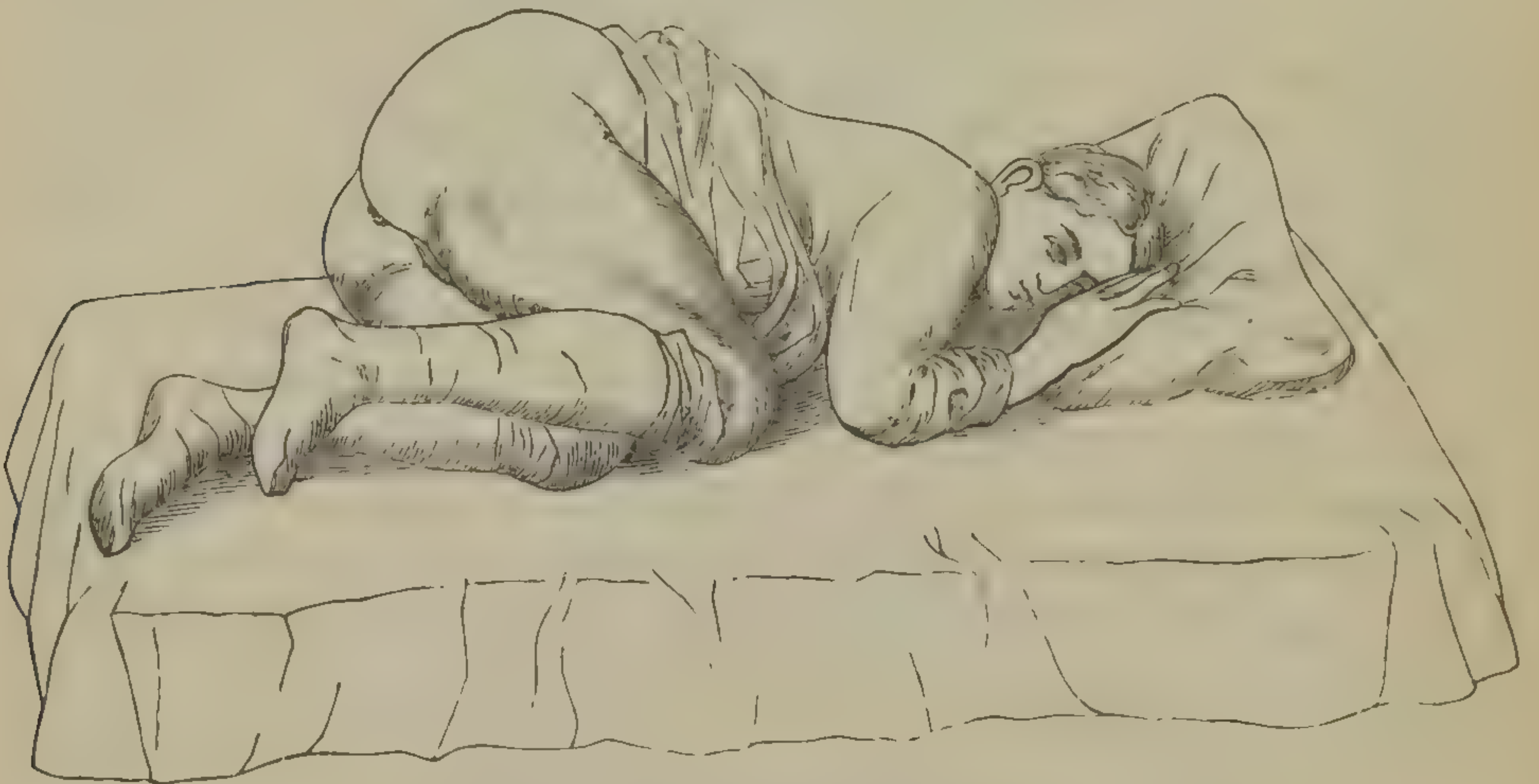
(a) *The Level-Dorsal Position*, where the patient lies on a hard flat surface, of convenient height for the examiner, having the head, shoulders, sacrum, and soles of the feet on the same level, the thighs flexed nearly at right angles with the abdomen, and widely separated. This is the position most commonly assumed in this country, and is most *useful* where a bimanual examination is to be made, hence it should always be employed in a first examination.

(b) *The Gluteo-Dorsal Position* is similar to the preceding, but the thighs are flexed so as to be in contact with the abdomen, and are widely separated,—the position being the same as that in which the patient is placed for the operation of lateral lithotomy. This position is *useful* whenever (1) it is difficult to reach the cervix or other pelvic viscus, either from great thickness of the abdominal walls, rigidity of the abdomen or of the perinæum, or from great length of the vagina. (2) It is also a convenient position in which to perform certain operations, as those for vesico-vaginal fistule, or for laceration of the cervix.

(II) When a patient is to be examined **on her side**, she may either lie (a) directly on her side—the *Lateral Position*—or (b) partly on her side and partly on her abdomen—the *Latero-abdominal Position*.

In the *Lateral Position* the head is supported by a low pillow, the hips are at the edge of the table, the thighs flexed at right angles to the body, the shoulders and hips perpendicular to the plane of the table. This position is *useful* in exploring the lateral and posterior portions of the pelvis (the right half is best explored with the right forefinger, the patient lying on her left side, and *vicê versâ*); in examining for a prolapsed ovary, if laterally displaced; in examining for and detecting slight perimetric exudations; for detecting dislocations of the coccyx; in examining the rectum, either by the speculum or by eversion; and in percussing for free ascitic fluid.

FIG. 8.



POSITION FOR SIMS' SPECULUM.

(*b*) In the *Latéro-abdominal, Semiprone or Sims' Position*, the patient lies on her left side on a hard flat table; her head supported on a low pillow, and turned on her cheek; her left shoulder and left half of the thorax touching the table; the other shoulder but slightly raised from it; her left arm thrown out behind, and hanging over the edge of the table; her left hip touching the edge of the table, her right hip somewhat to the left, in correspondence with the right shoulder; her knees and thighs flexed at right angles, the right knee slightly overlapping the left, and the feet close together, projecting over the corner of the table and supported. This position is *most useful* whenever an ocular examination of the parts with-

out any disturbance of their normal position is desirable, as well as for most instrumental and operative procedures on the vagina and cervix.

(III) When a woman is to be examined on her knees, she may be placed either on her knees and chest—the *genu-pectoral position*—or on her knees and elbows—the *genu-cubital position*.

(a) In the *Genu-pectoral position* the patient is placed on a hard couch or table, with one side of her face supported by a low pillow, while her shoulders and the upper part of her thorax are on the couch. Her knees and hips are close to the edge of the table and her thighs at right angles to the abdomen. In this position the vagina is elongated and the uterus tends to become more anteflexed than normal. If, however, the uterus is retroverted, this position does not replace it, but causes the cervix to pass further from the vaginal orifice, on account of the elongation of the vagina.

The genu-pectoral position is *useful* in the manipulations necessary for the replacement of retroverted uteri, or prolapsed uteri or ovaries, to aid in determining the length of an apparently elongated cervix, or in the introduction of certain pessaries.

(b) In assuming the *Genu-cubital position* the patient rests on her elbows and knees, the thighs being flexed at right angles to the trunk.

This position is occasionally resorted to in operations for vesico-vaginal fistulae, when the parts are not readily accessible in the latero-abdominal position.

(IV) **The Erect Position** is not often resorted to for purposes of examination. When it is, the patient stands before the examiner, who passes his hand under her clothes, as he sits or kneels before her, her thighs being well separated.

This is a good position in which to verify diagnoses made with the patient in other positions, especially diagnosis of uterine displacements; to ascertain the degree of prolapsus of the uterus, and to determine whether a pessary is in good position and fits the patient.

The gynæcologist in arriving at a diagnosis must make use of three of his senses, aided or not by instruments—these are the senses of sight, of hearing and of touch, the latter being the most useful. Occasionally, also, the sense of smell is useful in the diagnosis of

cancer. Of the means of investigating disease, independent of the use of instruments, **inspection** may be first employed.

(I.) INSPECTION

(A) **Of the Mammæ** is only to be practiced when the condition of the patient demands it. The patient may stand before the physician and uncover her breast, or better still, she may lie on her back with her clothes loose and her breast uncovered. When such an examination is necessary, the physician should observe the form, color, size and firmness of the breast, the presence or absence of cicatrices or other abnormal conditions, the prominence of the nipple and its shape and size, the color of the areola and the prominence of the tubercles of Montgomery, which, if prominent to an unusual degree, and the patient is not nursing a child at the time, afford strong presumptive evidence of pregnancy.

(B) **Of the Abdomen.**

(1) *How Practiced.* The patient lies in the level-dorsal position with her clothes loose about her waist, and well drawn up so as to uncover her abdomen. Her lower extremities are covered by a sheet, which is drawn up over the mons veneris, no part of which should be exposed.

(2) *What to Observe.* The physician should note the *form* of the abdomen (whether it is distended or not), the *shape*, the *color*, the condition of the *umbilicus* (whether prominent, retracted or normal), any movements which may be present, due to a foetus, intestinal peristalsis, to contractions of the abdominal muscles, or to pulsations of the abdominal aorta. He should observe the presence or note the absence of cicatrices, such as the *lineæ albicantes*, which, if recent, are pearly, glistening and of a bluish or livid hue, while if old are dull white and scarred. They show that the abdomen has been distended, but are not diagnostic of previous pregnancies, as they are found in distention due to other causes, as great obesity, are often found on the thighs, and may even be seen in men. Cicatrices from other causes should also be looked for, as those due to tapping, to leeching, to cupping, or to incisions for diagnostic purposes, or for the removal of ovarian tumors, etc.

Any separation of the recti muscles should also be looked for, and the causes of all these conditions sought.

(C) Of the Genitalia.

This should only be practiced when *absolutely* required.

(1) *Indications for Inspection.* Inspection of the genitalia is called for when the patient complains of any *local tenderness*, or when there is a *suspicion of chancre*, or of *gonorrhœa*; when *pruritus* is present which may be due to eruptions, parasites (pediculi or ascarides), irritating discharges, or neurotic conditions (seen specially in the aged), or when the patient complains of a *protrusion* from the vulval orifice.

(2) *How Practiced.* The patient should lie in the level-dorsal position, with her clothes well drawn up under a sheet, which is spread entirely over her, and the lower part of which is then pressed inward between her thighs, so as to expose the genitalia, but completely cover her limbs.

(3) *What to Observe.* Note the *size* and *color* of the labia; the *presence of pediculi*, or of *eruptions*; the *length of the perineum*; *hemorrhoids*; *gaping of the vulval orifice*, if present; the *size of the clitoris*; the presence of any *ulcers* whether follicular, chancroidal, or epitheliomatous; the presence or absence of *chancre*, or of *mucous patches*; *varicose veins* or *œdema*.

Separate the labia with the fingers and observe the *color of the mucous membrane* at the vaginal orifice, which normally is a pale pink, but which when irritated or inflamed becomes red and eroded, and in pregnancy often assumes a bluish or purplish hue. See if there is any tendency to *rectocele* or *cystocele*, whether the *hymen* is present, is intact, or is replaced by the carunculæ myrtiformes; and observe the presence of any *secretion* which may be escaping from the orifice of the vagina.

The character of any secretion should also be examined, even should there be none escaping, but only a small amount adherent to the examining finger or sound. *Vaginal secretion* is creamy, thin or purulent, and of an acid odor and reaction. When *creamy* it is usually chronic, and depends on venous congestion, or on general anæmia; when *greenish*, it indicates some acute inflammation, as gonorrhœa.

Inflammation or *cyst* of the vulvo-vaginal gland should also be looked for and the appearance of the *urinary meatus* should be observed; a patulous, enlarged meatus may be due to dilatation for diagnostic purposes; or, when the enlargement is excessive, to habitual use for copulation. Small, bright red bodies projecting from the meatus are *urethral caruncles*.

DISCHARGES FROM THE FEMALE GENITALIA.*

CHARACTER.	SOURCE.	APPEARANCE AND PROPERTIES.
Watery (hydrorrhœal and mixed).	<i>Uterus</i> —accompanying and following pregnancy; associated with malignant disease, hydatids. <i>Vagina</i> —vesico-vaginal fistulæ, rupture of ovarian cyst. Discharge frequently physiological, both from uterus and vagina; the quantity of water the vagina can secrete is shown in the profuse discharge after a glycerin plug is worn in it.	At times colorless, or mixed with blood; variously colored, with cells of different kinds, or containing shreds of decomposing débris, or hydatids, or urine.
Mucous and epithelial, often containing epithelial globules, oil. Frequently physiological exaggeration of the normal secretion, as in pregnancy or associated with menstruation.	Fallopian tubes. Cavity of fundus uteri. Canal of cervix uteri. External surface of cervix and the lips of the os and fundus of the vagina. Seen occasionally in excess during pregnancy. Some portion of vagina.	Whitish, alkaline, columnar epithelium; at times viscid, like unboiled white of egg; when aggravated, fills the cervix and os uteri as a tenacious pus most difficult to remove, and is quite characteristic of endometritis. It may be the cause of sterility. Where the secretion is simply increased and attends corporeal leucorrhœa, it is known as the "whites," and is as a rule a proof that the general health is not good. Acid reaction; varies in consistence—generally thick, creamy, white or yellowish-white, adhering often closely to the cervix and os uteri, and almost membranous in character; squamous epithelial cells, oil globules.
Sebaceous, readily becoming purulent.	Vulva, labia, vulvo-vaginal glands, sebaceous glands.	Acid mucus; character depends on the nature of inflammation; contains at times parasites and fungi— <i>trichomonas vaginalis</i> ; <i>leptothryx buccalis</i> .

* "Practical Manual of Diseases of Women and Uterine Therapeutics," by H. MacNaughton Jones, M.D., M.C.H., F.R.C.S.I. and E.

DISCHARGES FROM THE FEMALE GENITALIA.

Continued.

CHARACTER.	SOURCE.	APPEARANCE AND PROPERTIES.
Pus.	Purulent discharges may come from the Fallopian tubes, the result of salpingitis; from any part of the uterus, mingled with mucus; from the vagina and vulva. Pus may find its way through fistulous openings, and into the vagina either by bursting of a suppurating cyst, which has formed adhesions, or the escape of pus from a pelvic abscess, the consequence of parametritis or a pelvic hæmatocele.	Acid, fatty mucus, oily particles, epithelial cells. The appearance of the purulent secretion will in great measure depend on its source and the form of inflammation that has produced it; it may be profuse and thick, scanty and thin, very fetid or almost odorless, tinged with blood or rusty-looking, or of a dirty greenish color. The discharge of vaginitis is, as a rule, profuse, pouring in quantity, and is, especially if it be gonorrhœal, thick and yellow and persistent. It is mingled with epithelium.
Hemorrhagic (excluding the hemorrhages of pregnancy).	Blood may pour from any portion of the generative tract. We have three principal heads under which we may classify the occurrence of all hemorrhages: 1. Menstrual or altered menstrual flow. 2. Disease occurring in any part, as in salpingitis, metritis, endometritis, catarrhal cervicitis, subinvolution, uterine fibroid, polypus of any kind, granulations, vascular tumors, urethral caruncle. 3. Traumatic, injuries, operations. <i>Vagina.</i> —Same constitutional causes as produce hemorrhage from the vulva; granulations, abrasions, ulceration, varicose states, thrombus, traumatic causes, malignant disease.	The blood at times is mixed with menstrual discharge, or is merely altered menstrual flow, excessive in quantity (menorrhagia); the blood is then mixed with the debris of uterine tissue, epithelial cells, fatty and oil particles, mucous corpuscles, or, if there be ulceration, pus, and the products of inflammation. May be arterial or venous, dependant upon its cause, whether there is active or passive congestion, due to direct rupture of vessels from ulceration and slough, or by laceration, or wounds of any kind. In the various blood conditions and exanthemata, the blood poured out is generally dark and does not readily coagulate, rendering the hemorrhage difficult of suppression.
Hemorrhagic.	<i>Rectum.</i> —Hemorrhoids; congestion of the rectal mucous membrane; fissure; ulcer; malignant disease; traumatic causes. Bleeding from the rectum may accompany hemorrhagic discharge from the vulva and vagina. <i>Vulva</i> —in the exanthemata (variola, typhoid and typhus fevers, measles); spinal meningitis; malignant ulceration; gangrene; noma; thrombus; varicose conditions; various blood states, as in leucocythæmia and scurvy; in hemor-	

DISCHARGES FROM THE FEMALE GENITALIA.

Continued.

CHARACTER.	SOURCE.	APPEARANCE AND PROPERTIES.
	rhagic diathesis; wounds, operations, coitus; from vascular excrescences, and tumors.	
1.—Those hemorrhages connected with menstruation, and often associated with irregularity of the menstrual period.	<i>Uterus.</i> —1. Simple menorrhagia—physiological excess attendant upon ovulation; in plethoric states from excess of coitus; excessive menstruation at the “change of life”—during the menopause; from suppressed skin secretion; the result of cold taken previous to or during menstruation.	
2.—Hemorrhages due to disease elsewhere.	Uterine hemorrhage dependent upon hepatic, cardiac and renal affections; in phthisical states.	
3.—Hemorrhage due to abnormal uterine states, and morbid changes in the uterine tissues.	Uterine hemorrhage associated with uterine hyperplasia, subinvolution, hypertrophy; versions and flexions, simple congestion, of cervix or body; stenosis; metritis; endometritis; fibroid enlargements; polyps; granular changes in the endometrium; fissure of the os uteri and cervix; thrombus; malignant disease; extra-uterine foetation; syphilitic disease; wounds.	
Air (<i>physometra</i>). The air is expelled by the muscular action of the vaginal wall.	<i>Vagina and Uterus.</i> —In the knee and elbow position air enters the vagina more or less readily; the vaginal walls separate. Also in the semi-prone position. Air may accumulate when a pessary is worn; if there be a fistulous communication with the bowel, or in prolapsus uteri.	

(II.) AUSCULTATION.

This should *never be neglected* when there is any reason to suspect *pregnancy*. It is *useful*, not only in aiding the detection of advanced pregnancy, but also in aneurism; in adhesions, where friction sounds may sometimes be heard; in tumors nourished by large arteries, where a systolic thrill and murmur may be detected; and in ascitic fluid, which, when free in the peritoneal cavity, will cause a splashing sound on change of position.

(III.) PERCUSSION.

- (1) **How Practiced.**—Percussion is performed in the usual manner with the fingers or pleximeter—the patient lying in the recumbent posture, with the thighs flexed, the clothing loose about the waist, and the abdomen exposed. After percussion has been performed in this position, it should be repeated when the patient is lying on either side, and finally, if necessary, while the patient is seated before the physician.
- (2) **Percussion is useful** to determine the *extent of tumors* by ascertaining the extent of the line of dulness which it elicits; to determine *whether the intestine is interposed* between the tumor and the abdominal wall; to diagnose between *ovarian tumors*, where the uniform dulness will show that the intestines have been displaced laterally and behind the tumor, and the percussion dulness will not change its site when the position of the patient is altered; and *renal or splenic growths* where the intestinal tympanic note is usually heard at some spot on the anterior abdominal wall; *free fluid in the abdominal cavity* is shown by a tympanitic sound generally found on the anterior abdominal wall, with dulness at the sides and below, while on change of position the tympanitic note rises to the highest level, the area of dulness sinking to the lowest; a *movable mass* in the abdomen causes a change in the position of the dulness on change of position of the patient. Percussion is also useful to define or locate *plastic exudations* in the cellular tissue of the broad ligaments and peritoneal cavity.

(IV.) PALPATION.

- (1) **How Performed.**—The patient should be placed in the level-dorsal or gluteo-dorsal position, with the thighs sharply flexed but not separated. The physician should use the tips of his fingers only, and, with a pawing motion, carefully explore in regular succession the supra-umbilical region with the fingers pointing upward, the median region with the fingers pointing directly backward, and the infra-umbilical region with the fingers pointing downward to the pubis.

(2) **Obstacles to thorough Palpation:—**

- (a) *Reflex contraction of the abdominal muscles* may prevent a thorough exploration by this means, but may be partially prevented by gentleness in the manipulation, or it may be overcome, when it is not possible otherwise to prevent it, by etherization.
 - (b) *Much adipose tissue* in the abdominal walls may also render palpation difficult, if not impossible.
 - (c) *Tenderness and inflammation* of the abdominal or pelvic viscera may prevent the examination, but gentleness and persuasion will often overcome the dread of the procedure, and the consequent contraction arising therefrom.
 - (d) *An accumulation of free fluid* in the abdominal cavity may render palpation useless, and may have to be removed before it can be performed with success.
- (3) **Caution** must be used in this manipulation so that adhesions be not injured, or small cysts ruptured.
- (4) **Uses.**—Palpation is especially useful in detecting and tracing out *large tumors* attached to the uterus, ovaries, liver, spleen, kidneys, etc. It aids materially in the diagnosis of
- (a) *Pregnancy*, which, if early, causes a spherical, uniform enlargement of the uterus, which will be elastic on palpation and dull on percussion; and this, with the rational signs make the diagnosis easy; while if the examination is performed at a later period, the fœtal parts may be recognized through the abdominal walls by the palpating fingers.
 - (b) *Distended Bladder*.—The bladder should always be emptied before an examination. If, however, this precaution has been neglected, palpation will show a uniform ovoid, holding a central position, with no depression between the tumor and the symphysis pubis, the tumor being dull on percussion and tender to the touch.
 - (c) *Fecal Accumulations* (if large).—When these are in the sigmoid flexure they might readily be mistaken for *semi-solid ovarian tumors* or *coils of intestine* matted together; but fecal masses are at first soft, pultaceous, and readily displacable, while later they are hard nodules.
 - (d) *Tumors in the Anterior Abdominal Walls*, from *Intra-*

peritoneal Growths.—In the former case it is often possible to make the hands almost meet behind the tumor.

- (c) *Subperitoneal Plastic Exudations* in the iliac fossa, from *Pelvic Exudations*, by the fact that the former can be very readily palpated and percussed, while the latter are difficult of access.
- (f) *Retroperitoneal Tumors* (from the liver, spleen, kidneys, etc.) usually grow downward, leaving a groove between the pubis and the tumor, while
- (g) *Pelvic Tumors*, as a rule, grow upward, and leave no such groove.

Diagnosis of the Variety of Tumor by Palpation:—

Palpation is also useful in the diagnosis of the variety of tumor from which the patient suffers, thus:—

- (a) *A smooth, uniform, elastic tumor*, transmitting a wavy sensation to one hand placed against it when it is percussed by the other hand, must be due to a *large cyst* with thin walls and fluid contents.
- (b) *A hard, dense, nodular mass*, with protuberances on its surface giving no sense of fluctuation to the hand, is most likely a *subperitoneal uterine fibroid*.
- (c) *A doughy, fleshy mass*, with irregular surface, is probably either a *semi-solid ovarian tumor* or a *uterine fibro-cyst*.
- (d) *The sensation of gradual hardening* on palpation is characteristic of *muscular fibre*, and is most probably due to an *enlarged uterus*.
- (e) *Fluctuation* may be hard to detect when very deeply seated. A *soft, vascular myoma*, or the elastic wave due to *much adipose tissue* in the abdominal walls, *may be mistaken for fluctuation*.

When there is a *collection of ascitic fluid* in the abdominal cavity, the seat and area of fluctuation (as well as the percussion dulness) will change on change of posture.

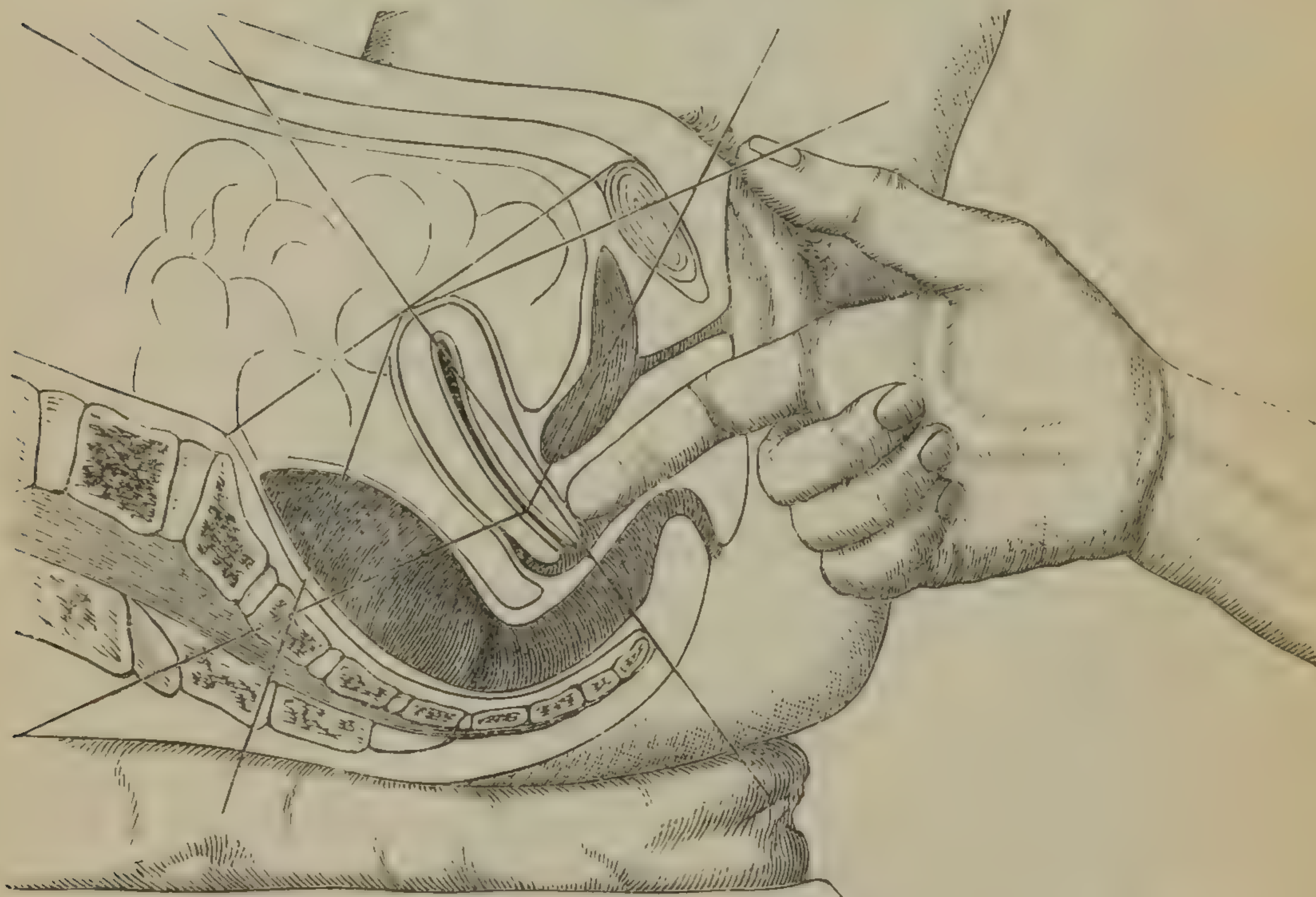
The more rapid the wave transmitted to the hand, the thinner is the fluid.

(V.) DIGITAL EXAMINATION.

Of all the means at the disposal of the gynæcologist, *the touch*, as it is called, is the most important, and the one from which he derives most information.

(1) **How Made.**—The patient having assumed one of the positions already mentioned, the physician stands, sits or

FIG. 9.



DIGITAL EXAMINATION IN THE DORSAL POSITION—TOUCHING THE CERVIX ($\frac{1}{3}$). (Byford.)

kneels before her, as is most convenient to him, and passing his hand (the left is usually preferred) under the sheet which covers her, he introduces his forefinger, or his fore and middle fingers, into her vulva, being careful to introduce the fingers into the lower or posterior part first, as otherwise he may touch the clitoris and cause an orgasm which would not only be embarrassing to the patient, but would seriously interfere with the results of the examination.

He should carefully explore, in regular order, the *vulva*, the *orifice*, *walls*, *cavity* and *vaults of the vagina*, and lastly the *uterus*. Inspection of the genitalia may, if necessary, be practiced at the same time. A digital examination is sometimes made *through the rectum*, when it is desirable to explore the retro-uterine space, Douglas's cul-de-sac, the posterior uterine surface, the sacral excavation, or the sacro-sciatic notches, or *through the bladder*, the urethra having been previously dilated, if it is necessary to ascertain the condition of that viscus, or of the ante-uterine peritoneal excavation and cellular tissue, or the anterior uterine surface and fundus. As, however, it is ordinarily only necessary to investigate the condition of the cervix, the recto- and vesico-vaginal septa, the vaginal vaults and para-uterine cellular tissue, the other parts being easily reached on making a bi-manual examination, it is only in special cases that the latter cavity is used for exploratory purposes.

(2) What to Examine for:—

- (a) *The Vulva* :—(aa) *Enlarged, pendulous, and highly pigmented nymphæ* give rise to a suspicion of masturbation, or of sexual excesses, or may be due to frequent parturition.
- (bb) *Erosions on the labia majora* are caused by scratching to relieve the irritation caused by pruritus vulvæ or parasites. If the erosions are flat and somewhat elevated, they are due to folliculitis, or are mucous patches.
- (cc) *A lacerated fourchette or perineum, or obliterated carunculæ myrtiformes*, usually means previous parturitions.
- (dd) *Unbroken hymen*, with sharp borders, spherical or crescentic in outline, usually, but not always, denotes virginity.
- (ee) *A hymen which is torn in one or more places*, but which is capable of being restored by bringing its edges together, generally indicates that sexual intercourse has taken place but childbirth has never occurred. The hymen may however be ruptured from other causes, as for diagnostic purposes, or even by scratching to relieve irritation of the parts.
- (ff) *If the hymen is imperforate and is bulging at the vaginal orifice*, it indicates that the menses are retained by it, and calls for an operation to allow them to escape.

(gg) *An enlarged patulous meatus urinarius* may be due to dilatation for diagnostic purposes, or if excessively enlarged, may possibly have been used for copulation habitually.

(hh) *A small, bright red body projecting from the urethra* is a caruncle or hyperplastic papilla; or, if in the form of a complete ring around the meatus, prolapse of the urethra. It generally causes painful and frequent urination.

(b) *The Vagina.*

(aa) *The orifice is gaping and patulous* after a recent confinement, or in women who have borne many children; is *red, eroded and tender* when any irritating discharge is present, or in women who indulge in excessive sexual intercourse, or practice masturbation.

(bb) *The walls.* *A protrusion of either the anterior or posterior wall* results from vaginal subinvolution subsequent to confinement, or from relaxation from some other cause.

(cc) *The cavity* may be *very rough* (feeling somewhat like a nutmeg grater) from granular vaginitis—a congestion or hyperplasia of the vaginal papillæ; or *very smooth, slippery and moist*, from hyper-secretion, either of the vaginal or uterine mucous membranes, or *adhesions* may be felt between the vagina and cervix, or *cicatricial contractions* of the vagina may be present, either of which may have been caused by adhesive vaginitis of puerperal, or of specific origin, by the abuse of caustics, or by ulceration, which may be produced, for instance, by the long-continued use of a pessary.

(dd) *The vaults.* *A solid body felt in front of the cervix*, is usually the *uterine fundus* displaced anteriorly (other tumors in this situation are rare); sometimes *uterine fibromata* are found in this situation, sometimes a *hæmatocele*, or a *cellulitic deposit*, and occasionally an enlarged and anteriorly *displaced ovary* may be found here.

A solid body behind the cervix is most commonly a *retro-displaced fundus uteri* (generally soft, elastic, oblong and tender); or quite frequently, it is a *subperitoneal uterine fibroid* (usually hard, elastic, perhaps nodular and often irregular in outline); *small ovarian tumors* are also found

in this situation (they are soft, elastic, more spherical and usually slightly tender); all of these tumors are movable when the uterus is moved, and should be gradually pushed up and their relations to other parts carefully studied. They are only immovable when adhesions have formed, attaching them to other parts. A *cellulitic* or *peritonitic exudation* is also found in this situation, as may also be the remains of an *hæmatocele* (when recent, they are soft, doughy, impressible and very tender; when of longer standing they are hard, almost board-like to the touch, dense and scarcely sensitive at all); these tumors are absolutely immovable. A *rectum loaded with feces* may give rise to a tumor in the posterior vaginal vault, but it is easily recognized by its impressibility and the number of scybala which it contains. A *prolapsed* and *slightly enlarged ovary* may often be felt directly behind the cervix in Douglas's cul-de-sac, on a level with the os uteri (they are flat, movable, tender bodies, about the size of an almond or small fig; they are often so movable that it requires two fingers to grasp them, and are not sensitive except on severe pressure, unless they are enlarged or inflamed); sometimes both ovaries will be found prolapsed in this situation. Among the rarer tumors found here are *sacral exostoses*, or *carcinomata* and *pelvic echinococcus tumors*.

At the sides of the cervix, the finger should normally detect only a soft, elastic, somewhat resistant sensation during an examination; cellulitis in the broad ligament will give rise to a *moderately firm, smooth, often convex, tumor*, tender, sometimes hard, sometimes doughy and boggy, sometimes fluctuating; if of long standing the tumor will be shrunken, hard, and not sensitive. *Irregular, flat, more or less tender nodules* are often found in different parts of the *retro-lateral pelvic connective tissue*, and are the remains of former attacks of cellulitis, or perhaps enlarged pelvic glands.

(c) *The Uterus.*

(aa) *Shape of the Os Uteri.*—A small round or transverse os *with smooth lips* usually indicates that the patient has not borne children. Sometimes, however, a small transverse os

is met with in multiparæ, who have sustained no injury to the soft parts during childbirth.

A rigid os, cicatricially contracted, usually results from the abuse of caustics, and may be the cause of acquired sterility.

A gaping fissured os, often admitting the end of the finger, and having irregular lips, is found in multiparæ.

A patulous external os, the borders of which are intact, is seen in multiparæ during chronic endocervicitis, or after the use of tents; it is also found after a recent abortion, when there will be excessive moisture and softness of the os.

A long pointed conical cervix, or a cervix curled up anteriorly with the os pointing upward, or with a minute pin-hole os, is often the cause of congenital sterility.

(bb) *Shape of the Cervix*.—When the surface of the cervix is *irregular and nodular*, feeling somewhat like peas under the mucous membrane, there is either an eversion of the cervical mucous membrane or a laceration of the cervix; little retention cysts—the ovula Nabothi—have formed. This condition sometimes closely simulates epithelioma, but scarification (a glairy mucous escapes if it is due to retention cysts) and subsequent microscopical examination will settle the diagnosis.

If the cervix is *fissured*, it usually indicates that a child has been delivered at or near full term, but does not necessarily prove that the obstetrician has been unskillful, as laceration sometimes occurs even under the hands of the most accomplished physician.

A crater-like excavation in an immovable cervix, into which the finger can often be introduced almost to the os internum, the edges of the excavation being hard and irregular, and nodular swellings being felt imbedded in the vaginal walls, indicates the ulcerative stage of carcinoma.

(cc) *Consistence of the Cervix*.—*Excessive softness and puffiness* of the cervix, often associated with hypersecretion, and with softness and puffiness of the vagina and labia, is generally due to pregnancy.

A soft, readily-bleeding cauliflower-like growth of large size,

involving the whole cervix, or growing from either lip (usually the anterior lip particularly) and readily breaking down under the examining finger, can only be epithelioma.

A hard, almost cartilaginous, somewhat enlarged cervix, is either due to hyperplasia (subinvolution), to the application of caustics to a lacerated cervix, or an everted mucous membrane, or to the early stage of scirrhus carcinoma (a microscopical examination of the scrapings from the cervix will settle the diagnosis).

A puffy, moderately hard, and nodular cervix, two or three times the normal size, with the enlargement usually extending above the vaginal insertion is the first stage of parenchymatous cancer.

(*dd*) *Position of the Cervix.*—If the cervix and os uteri point backward, the fundus is probably in the opposite direction. If the cervix is forward under the symphysis, the fundus can be felt through the posterior vaginal vault, except where there is a retro-uterine tumor, when the uterus is usually straight, and it often cannot be felt through the vagina at all. If the cervix and os are in the normal position, but the examining finger detects an angle at the vaginal insertion in the anterior, or in the posterior vaginal vault, there is either ante- or retroflexion as the case may be.

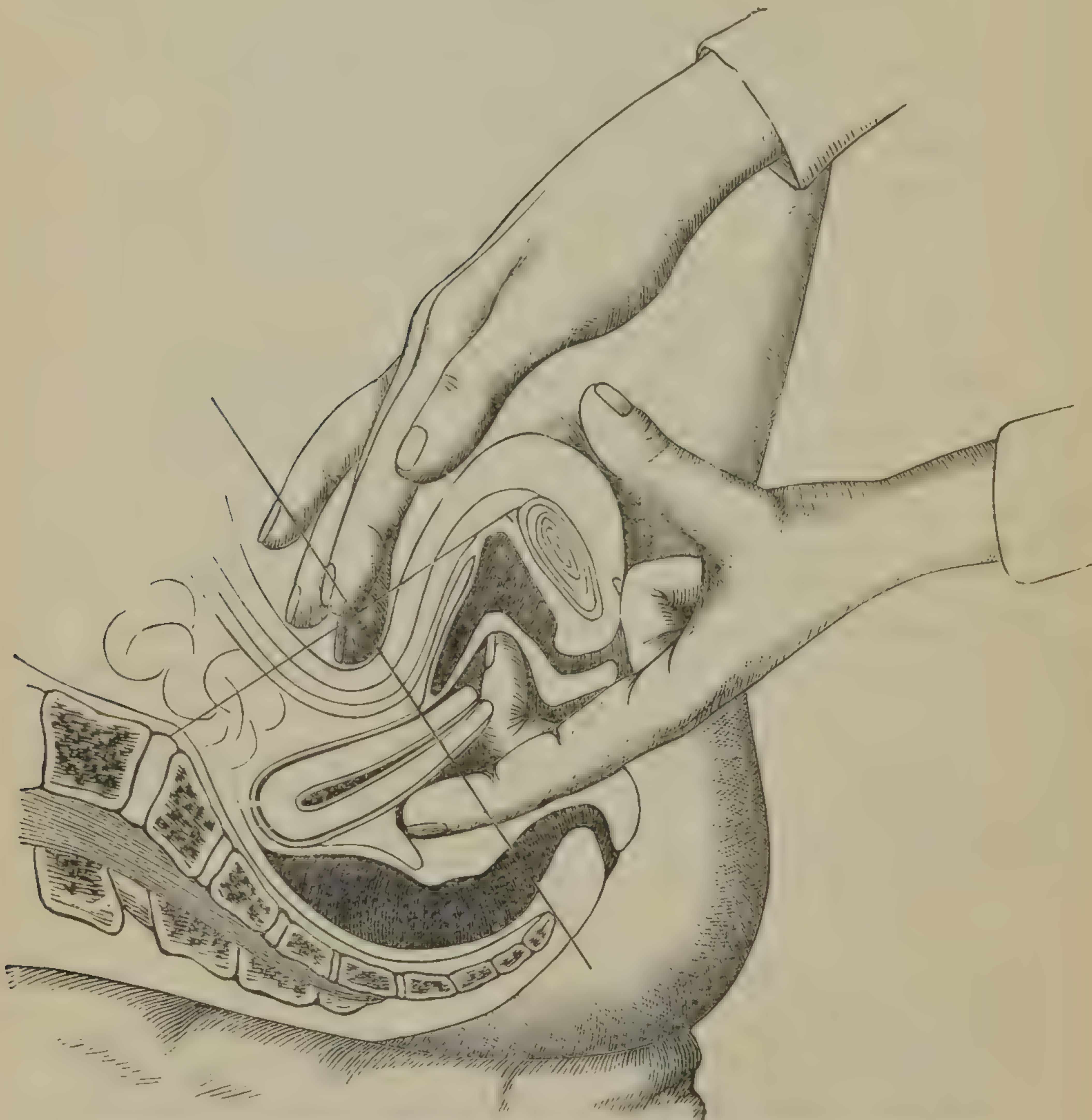
If the cervix is drawn to one side of the pelvis, the fundus usually occupies the opposite side. This is generally due to adhesions, either in the broad ligament from cellulitis, or in other parts of the pelvis, or to uterine tumors.

(VI.) BIMANUAL EXAMINATION.

(1) **Definition.**—This is the simultaneous use of both hands, the fingers of one being used in the vagina or rectum, while the other hand is used externally to depress or steady movable abdomino-pelvic viscera; to move them about, or to palpate their surfaces. It is of great use in ascertaining the presence or absence of the pelvic viscera, their position, mobility, size, shape, and the presence and attachment of pathological formations in their neighborhood.

- (2) **Indications for a Bimanual Examination.**—Whenever digital examination is undertaken, a bimanual examination should be made at the same time.

FIG. 10.



BIMANUAL PALPATION OF THE UTERUS FROM THE POSTERIOR VAGINAL WALL.
(Byford.)

- (3) **Contra-indications.**—Spasmodic contractions, inflammation, or hyperæsthesia of the abdominal walls, may interfere

with an examination, but are to be overcome in the same manner as when they interfere with palpation.

(4) **Varieties.**—Bimanual Examination may be either *Recto-abdominal* or *Vagino-abdominal*. The latter is more generally employed.

(A) **VAGINO-ABDOMINAL EXAMINATION** is *performed* as follows: After the finger in the vagina has explored the vaginal vault and the vaginal portion of the cervix, the other hand, which was placed over the abdomen with the fingers slightly bent when the examination began, is gradually pressed downward toward the vaginal finger, until the fundus uteri is felt between the hands. If the hands almost meet in the anterior vaginal vault, no fundus uteri being felt between them, the vaginal finger is placed behind the cervix and the manipulation repeated. When the fundus has been found, it should be carefully studied, by making alternate pressure from above and from below, and by grasping it, if possible, between the thumb and fingers of the external hand, or by feeling its surface carefully by means of a pawing motion with the external fingers, as in abdominal palpation. Pressure should be made with the external hand midway between the symphysis pubis and the umbilicus, downward and somewhat backward, in order to find the fundus uteri.

After exploring the uterus thoroughly in the manner described, the remainder of the pelvis should be examined carefully, by moving the external hand to various parts of the lower abdominal surface and repeating the manipulation already detailed,

(5) **What to Ascertain.**—(a) *Uterus.* (aa) *Presence or Absence.* Endeavor to include the uterus between the fingers in the vagina and the hand on the abdomen, and thus determine its presence.

(bb) *Position.* (aaa) *Normal:* the vaginal fingers detect no solid body in either the anterior or the posterior vaginal vault, but the fundus may be pushed down by the hand on the abdomen, and the uterus included between the hands. (bbb) *Ante-displacement:* the fingers in the vagina detect a solid body in the anterior vault, which combined manipulation shows to be the uterus. The diagnosis may be verified

by the sound if its employment is not contra-indicated. (*ccc*) *Retro-displacement*: the vaginal examination has detected no solid body in the anterior vault, but has discovered a solid body in the posterior vault; the external hand cannot depress the fundus into the anterior vault, and often may have difficulty in detecting its presence. Press up the body in the posterior vault by the fingers in the vagina, and endeavor to study it. The fundus cannot be detected elsewhere. The diagnosis can be verified by the sound if its introduction is not contra-indicated. (*ddd*) *Inversion*: the finger in the vagina detects a pyriform tumor, surrounded above by a collar (the cervix), while careful vagino-abdominal, recto-abdominal, and vesico-rectal examinations reveal the absence of the fundus above.

(*cc*) *Mobility*. Normally the uterus is freely movable.

(*aaa*) *Excessive mobility* is shown by the fact that the uterus can be easily anteverted, retroverted, or displaced downward. It indicates that the uterine ligaments are in a state of relaxation. (*bbb*) *Diminished mobility*, especially when conjoined with a feeling of resistance, shows that there has been previous inflammatory thickening, or shortening of the uterine ligaments, or the formation of adhesions holding the uterus in a fixed position.

(*dd*) *Size*. The normal size of the uterus is about 3'' x 2'' x 1''. Any deviation from the normal size and weight of the uterus can be readily recognized by the experienced finger. (*aaa*) *Slight enlargement* may be due to *early pregnancy*: in this case the uterus is more pyriform than normal, the cervix is softer, and the fundus is more rounded. The history of amenorrhœa, and of morning sickness also, materially aid the diagnosis. In *acute metritis* there is tenderness on moving the cervix, which is swollen; tenderness over the abdomen in the situation of the fundus; the abdominal muscles resist manipulations, and there is fever and general constitutional disturbance. In *chronic metritis* (*arcolar hyperplasia—subinvolution*) the uterus is equally enlarged and the shape is not altered, the uterine tissues are firmer than normal, and on introducing the sound (if not

contra-indicated), it is found to pass into the uterine cavity for more than two and a half inches, and finds that cavity large and roomy. In *chronic endometritis* the uterine tissues are soft and flabby, the sound passes in for more than the normal distance, often detects irregularities of the mucous membrane, and its withdrawal is followed by more than the usual bleeding. *Small intra-uterine growths* give rise to enlargement of the uterus. The uterus in these cases is enlarged and firm, the os may be dilated, and the polypus may be felt protruding from or occupying it; the history differs from that of pregnancy, the sound passes in for four or five inches often, and may detect the growth; small mucous polypi, however, may escape detection until the cavity of the uterus has been dilated and explored by the finger. Granular endometritis rarely gives rise to much enlargement. *Hydrometra* also causes some enlargement, but the uterus is rarely larger than a small orange; there is some occlusion, preventing the escape of the serous fluid; there is fluctuation, absence of ballottement, and of the foetal heart sounds, and the trouble usually occurs after the menopause. *Physometra* also occurs after the menopause; the uterus increases very slowly in size, is light in weight, and a tympanitic note is elicited by percussing over the fundus. *Carcinoma of the uterine body* is rare. It is diagnosed by the history and later by the cachexia, the uterus soon becomes immobile, the sound shows that the cavity is enlarged, and its use is followed by profuse hemorrhage; it may detect the irregular surface of the uterine mucous membrane; curetting the uterus and the examination of the scrapings with the microscope will settle the diagnosis. *Sarcoma of the uterus* is diagnosed by the history; the sound shows the uterine cavity much enlarged, and its use is followed by much hemorrhage; curetting and the use of the microscope decides the nature of the case.

(bbb) *Great Enlargement of the Uterus* may be due to *Pregnancy* or to *Hydramnios*. In these cases the subjective signs of pregnancy establish the diagnosis. *Hæmatometra* is due to atresia, either congenital or acquired. The history

and the presence of the obstruction to the escape of the menstrual fluid show the nature of the case.

(ccc) *Diminished Size of the Uterus* may be due to *Congenital Malformation, Arrested Development or Atrophy*. Here the history of amenorrhœa, or of scanty menstruation; of sterility, if the woman be married, and often of hysteria, with the small size of the uterus, indicates the nature of the case. *Super-involution* or *Senile Atrophy* also gives rise to a uterus smaller than normal. In the former case the history indicates that the trouble followed childbirth; there is absent menstruation, usually pain at the menstrual periods, often hysteria, and other functional and constitutional disturbances; in the latter case, the age of the patient, the menopause, and the absence of symptoms which can be attributable to the size of the uterus, together with atrophy of the other generative organs, establish the diagnosis.

(ee) *Shape of the Uterus*.—Normally the uterus is somewhat pyriform in shape, flattened from before backward.

(aaa) *Malformation due to Arrest of Development*.—The most common are due to failure in embryonic development, and are the two-horned uterus; the one-horned uterus, and the double uterus.

Uterus Unicornis (one-horned uterus) is not always easy to diagnose. The fundus is turned to one side of the pelvis and has one ovary connected with it; the rudimentary horn and the other ovary lie at some distance from the fundus.

Uterus Didelphys (where the two halves remain separate throughout their entire course; rare). Here a groove is felt on the external surface of the uterus, and two sounds, when not contra-indicated, can be passed into the two sides, without coming in contact with each other.

Uterus Bicornis is comparatively frequent. Bimanual examination reveals a fundus of unusual breadth, with a depression in the centre.

(bbb) *Pregnancy* will alter the shape of the uterus. For the first 3 months the uterus is more pyriform than normal, because the fundus particularly is developing. The

anterior, posterior and transverse diameters are equal, the cervix is soft, there is some enlargement, with a soft, regular and obscurely elastic feel showing the presence of some fluid within it.

During the second 3 months the uterus becomes more regularly enlarged, and spheroidal in form, from development especially of the walls. The characteristic changes in position, and the positive signs of pregnancy should render the diagnosis easy, as a rule.

During the last 3 months of pregnancy the uterus assumes an ovoidal shape, on account of the development of the cervico-uterine canal and of the lower segment. The positive signs of pregnancy render the diagnosis easy.

(ccc) *Irregularities in the shape of the uterus* may be due to *extra-uterine fibromata*, *malformations* (see above), or *interstitial extra-uterine pregnancy*. The latter is of rare occurrence, and as the cyst ruptures very early into the peritoneal cavity, or into the uterus, it can hardly be diagnosed from a normal pregnancy prior to rupture. *Subperitoneal fibromata* have been spoken of in connection with abdominal palpation. In addition to what was then said, it may be added that on bimanual examination the tumors are found to be continuous with the uterus.

(ff) *Sensitiveness*.—*Normally* the uterus is not sensitive on examination, but should any *acute inflammatory condition* be present either in the organ itself, or in the connective tissue or peritoneum in its vicinity, pain will be complained of on touching, or, at all events, on moving, the uterus. In *chronic metritis* also pain is experienced, and the uterus is found to be enlarged (see above). When the uterus is *bound down by adhesions*, pain will be felt on attempting to move it.

(gg) *Consistence*.—The *normal* uterus is firm rather than hard. It is rendered *soft* by pregnancy, or when any fluid is retained in its cavity, and is *harder* than normal in areolar hyperplasia (subinvolution), and when uterine fibromata are present.

(b) *The Ovaries*.—These organs are not always easy to detect

when they are normal. Sometimes one or both ovaries are congenitally absent; when one ovary alone is absent, uterus unicornis usually exists, but the reverse is not necessarily true. Sometimes a third ovary is present. When this is the case, the supernumerary ovary is usually found near one of the others, and either in or behind the broad ligament.

(aa) *Position*.—Normally the ovaries are felt about the level of the pelvic brim, midway between the angle of the uterus and the border of the psoas muscle of either side. They feel like small spherical bodies about the size of a hickory nut, and readily glide away from the examining finger, so that thorough exploration of them is very difficult, without they can be fixed between the hand on the abdomen and the finger in the vagina.

They are often more readily accessible by a recto-abdominal exploration, especially if the uterus is either anteverted or anteflexed. If they are not felt in the normal position, they should be sought in other parts of the pelvis, as they may be prolapsed. *When completely prolapsed* the ovary is usually found directly behind the uterus in the lower part of Douglas's cul-de-sac (the introduction of the sound will differentiate this condition from a retro-displaced uterine fundus). *When the prolapse is only partial*, the ovary generally lies on one or the other side of the uterus a little above the junction of the body and neck, and is best explored by passing the finger up as high as it can go on either side of the cervix, and then carried downward toward the sacrum, so that if the ovary is displaced it will be caught between the finger and the sacrum. It can thus be fixed and its sensitiveness and mobility determined.

(bb) *Size*.—The ovary is *enlarged* in *acute* or in *chronic ovariitis*. In these cases, a mobile, tender body is found, about the size of a walnut or slightly larger, which is shown on bimanual examination to be an enlarged ovary, and pressure on which causes the characteristic sickening ovarian pain. They are differentiated by the acute or chronic symptoms. *An ovary enclosed in a mass of plastic exudation*, gives the above physical signs, but is fixed in position,—not mobile.

The ovary may be *atrophied*, and so small in consequence as to appear absent.

- (cc) *Neoplasms* of the ovary should also be sought for. They have already been alluded to in speaking of Palpation, and will be considered again under Diseases of the Ovary.
- (c) *The Oviducts*, when *normal*, cannot, as a rule, be felt on bimanual examination. Occasionally the round ligaments can be detected, feeling like little round cords rolling under the finger, and passing outward and forward from the sides of the fundus. When the oviducts are *enlarged*, as happens in *salpingitis* (occasionally), in *hydrosalpinx*, *pyosalpinx*, and *hæmatosalpinx*, they will be recognized high up in the pelvis, as elongated, tortuous and dilated tubes, lying at the side of the uterus, and often separated from it by a small piece of undilated tube, which is found between the sac and the womb. These conditions are differentiated from each other by the symptoms. They might be mistaken for *pediculated subperitoneal fibro-cysts*, but these are usually easily recognized by their hardness and roundness; *cysts of the broad ligament* are differentiated by being unilateral, and not possessing the characteristic dilatations of tubal diseases; *small ovarian cysts* are often situated in Douglas's cul-de-sac elevating the uterus, which is usually displaced forward, as will be the case when the diseased tube occupies a similar position; but in these cases it is often possible to find the corresponding ovary in its normal position and in a healthy condition by a careful recto-abdominal examination; retained fluid (generally blood) in a malformed uterus might be mistaken for *hydropstube*, and can often only be diagnosed by the history, and in cases of great doubt, by exploratory puncture; from *tubal pregnancy*, it is differentiated by being usually double, and by the absence of the changes in the vagina, uterus and breasts which indicate pregnancy.
- (d) *New Growths*.—Bimanual exploration furnishes important information, very frequently, in the case of tumors projecting into the cavity of the pelvis, by enabling the physician to ascertain not only the nature of the growth, but also its relations and connections.

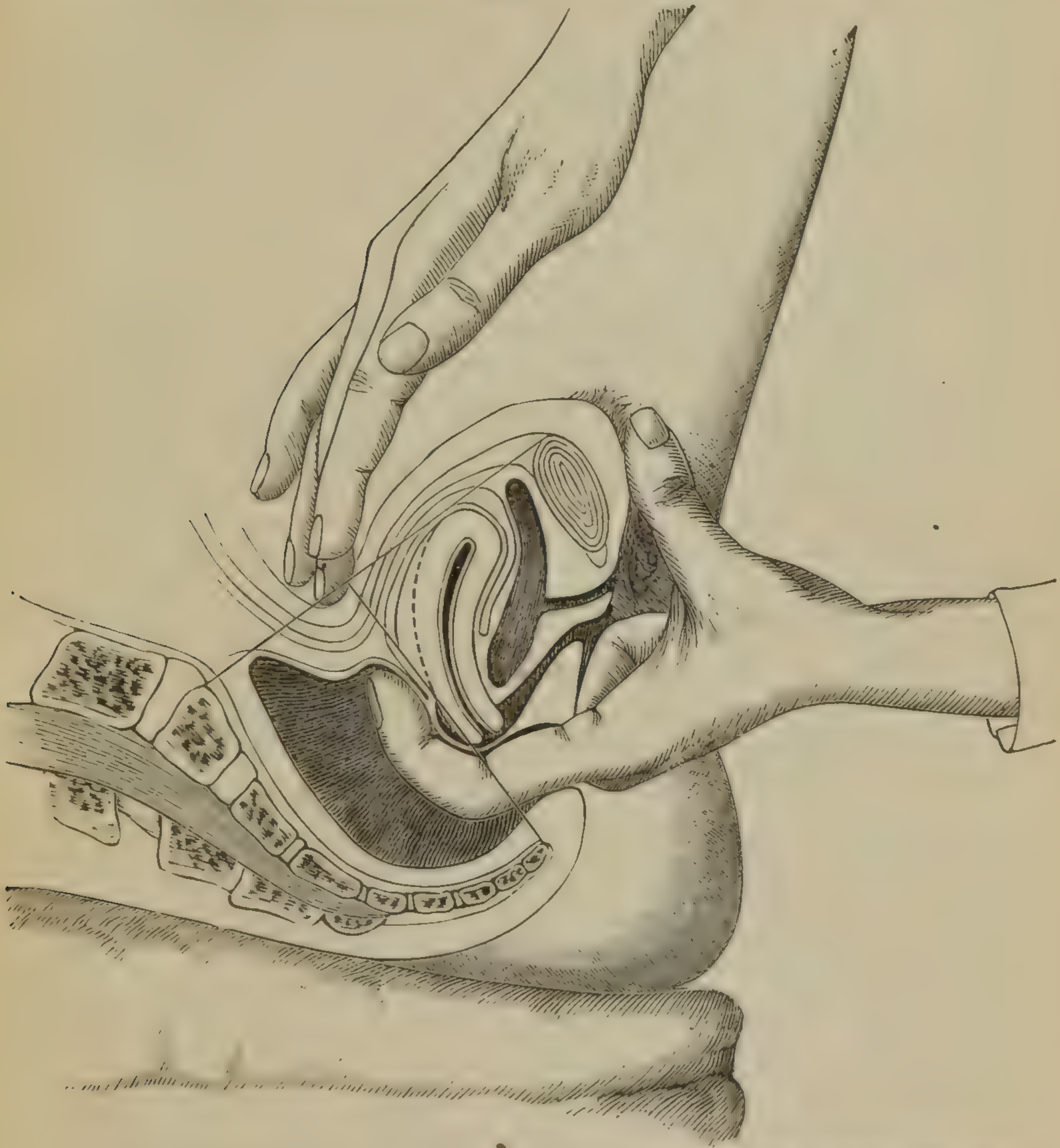
In these cases, after having explored the tumor thoroughly, and ascertained its position, shape, consistence and the character of its surfaces, it should be isolated and its boundaries defined. The tips of the fingers should be inserted, if possible, between the tumor and the uterus, ovaries, tubes, and pelvic wall in turn, at the same time that the hand on the abdomen presses down from above and endeavors to meet the fingers in the vagina as nearly as practicable, thus studying any connection which may exist between these parts and the tumor, or excluding such attachments. If this manipulation is impossible, owing to the size of the tumor, or on account of its being wedged into the pelvis, a change in the position of the patient will often be of service. Should this prove unsuccessful, the cervix may be grasped by a pair of volsella-forceps and drawn downward, or an effort may be made, through the abdominal wall, to elevate the tumor by drawing it upward.

(B) RECTO-ABDOMINAL EXAMINATION. — This method is alike more unpleasant to the patient and to the physician than that just described, yet, by it, important information is often obtained, especially respecting the condition of the oviducts and ovaries, the broad, round, and utero-sacral ligaments and the condition of the posterior pelvic wall, as well as of the posterior surface of the uterus. It may also be necessary, when atresia of the vulva or vagina is present, or in virgins with small vaginæ, or where it is not deemed advisable or is unnecessary to rupture the hymen.

(a) *How to make it.* Generally it is only necessary to introduce one, or, at the most, two fingers into the rectum, for purposes of gynæcological examination; although in case of necessity the whole hand (including the thumb) has been passed, and often without injury to the patient, or more inconvenience than a temporary incontinence, which usually passes away in a few days. As, however, a number of cases are recorded in which injury to the rectum resulted from the introduction of the hand, it should never be resorted to, except when especially indicated. The finger is passed slowly through the sphincter with a rotary motion following the axis of the canal, until it reaches the

third sphincter, where, on account of the collapse of the rectal walls, the passage of the finger may be difficult. In these

FIG. II.



BIMANUAL EXAMINATION OF THE POSTERIOR SURFACE OF THE UTERUS AND THE POSTERIOR PELVIC SPACES FROM THE RECTUM. (*Byford.*)

(*After a case of Hæmatoma.*)

cases the continuity of the canal should be carefully and gently sought by the tips of the fingers until found. If this

is impossible, about $\frac{3}{4}$ iv of water injected into the rectum will distend the bowel sufficiently to allow the passage of the fingers with ease.

The finger is now slightly bent, and the folds of the third sphincter and utero-sacral ligaments are pushed downward, thus giving the examining finger more play. Counter-pressure on the abdomen with the other hand now brings the parts within easy reach, as a rule. If rigidity of the abdominal wall prevents this manipulation from succeeding, it may be overcome in the manner already indicated.

(b) *What to ascertain.* As the finger is entering, notice the *sensitiveness* and *resistance* of the sphincter; be careful to *recognize* the *cervix* as felt through the anterior wall, and not to mistake it for a pathological growth; examine the condition of the *utero-sacral ligaments*, which are felt converging toward the isthmus in front, and feel like curved elastic cords.

Shortening, thickening, or great tension of these ligaments is usually the result of inflammation, and if excessive is likely to result in anteflexion, and is a contra-indication to rapid dilatation as a means of treatment. Any tenderness of these ligaments should also be carefully noted, as a possible indication of the presence of inflammation. The finger is now passed above the third sphincter, and the *posterior portion and fundus* of the uterus carefully examined. If it is not easily reached, pressure on the abdomen will generally bring it into reach, or the cervix may be grasped with the tenaculum or volsella-forceps through the vagina, and gently drawn downward until the uterus is in the desired position. Normally the utero-sacral and the broad ligaments, as also the third sphincter of the anus, are so yielding that they can be pushed gradually very far forward, and if the abdominal wall be depressed by the external hand, the *broad ligament* with the *tubes* and *ovaries* and the *round ligament* even may be distinctly felt, and their size, shape and mobility determined.

The entire *connective tissue* of the pelvis and the *bony wall* should also be carefully examined.

(C) VESICO-ABDOMINAL EXAMINATION is rarely necessary, except to determine the *presence* or *absence* of the *uterus* or *ovaries* in case of atresia of the vagina or absence of that canal.

In performing this manipulation, the urethra has generally to be previously dilated sufficiently to admit the index finger. This may be done by rapid dilatation with the finger itself, Hegar's dilators, or a pair of ordinary forceps, provided the edges are not too sharp.

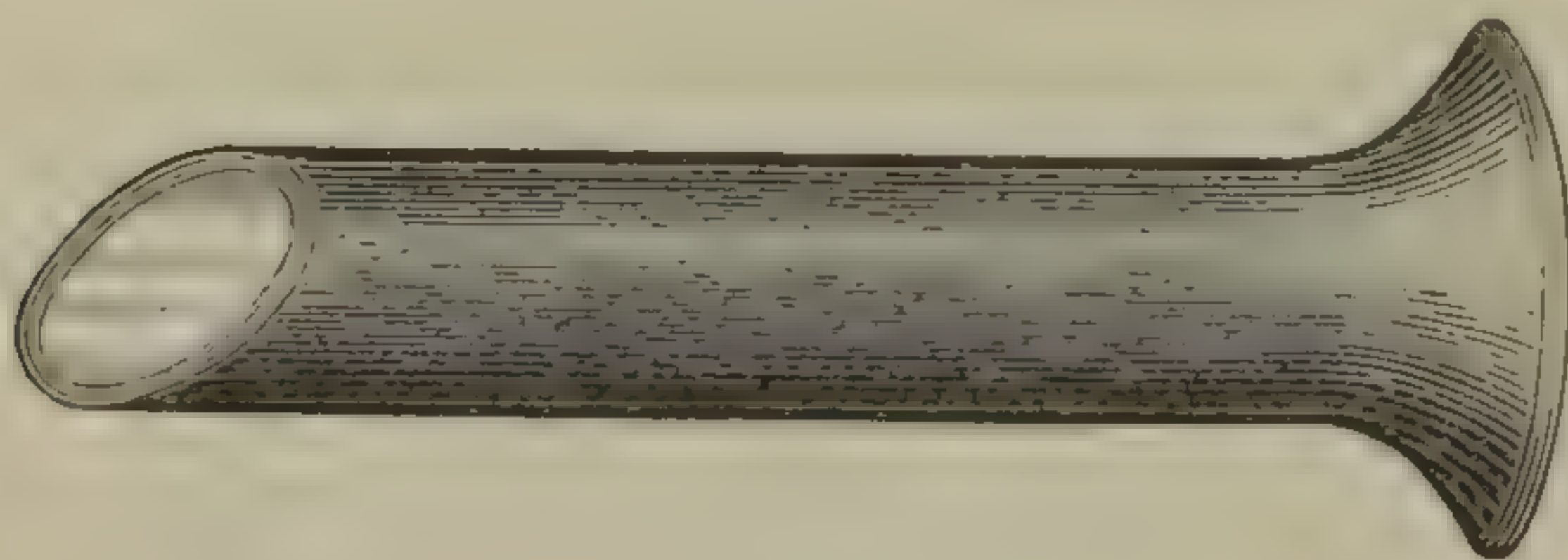
Dilatation should not be too hurriedly performed, and should not be carried further than is sufficient for the introduction of the index finger, else incontinence of urine, perhaps permanent, may result. To determine the presence or absence of the uterus when the organ is malformed and the vagina absent, it is rarely necessary to introduce the finger into the bladder, as conjoined exploration of the rectum with a sound into the bladder through the urethra, usually answers every purpose.

In addition to the means already described, the gynæcologist may employ various instruments to aid his senses. A *speculum* may be employed to bring those parts within the range of the vision which would otherwise be hidden; or the minute structure and character of fluids or growths may be studied by the aid of the *microscope*; fluids which otherwise would not be obtained save by a surgical operation, may be removed for examination by *aspiration*; the *curette* may be employed to obtain scrapings of diseased tissue, or of uterine or vaginal growths; the various cavities may be *dilated* by instrumental means to facilitate their thorough examination by the finger; the *sound* may be employed as an adjunct to the touch in examining the uterine or vesical cavities, or the uterus may be drawn downward by *tenacula*, or the *vol-sella-forceps*, to bring it within reach, so that it can be better examined, to steady it during manipulations, to correct displacements, or to determine its degree of mobility.

(I.) SPECULUM.

- (1) **Indications for its Use.**—The speculum should always be used at a *first examination*, unless positively contra-indicated; it should be employed if a condition is *detected by the finger which requires verification or correction by the eye* (as granular vaginitis; laceration, ulceration, hyperplasia, or carcinoma of the cervix; patulousness, or discharge from the uterus; the presence of leucorrhœal or sanguineous discharges, the origin of which from the vagina, cervix, endometrium, or from pelvic abscesses, can only be told by direct inspection).
- (2) **Contra-indications.**—The speculum should not be employed when a previous digital examination has shown that its *introduction would be productive of no result*; when a *hymen or*

FIG. 12.



FERGUSSON'S SPECULUM. (Doran.)

other obstacle to its introduction (acute inflammation, ulceration, stricture, or atresia of the vagina) is present; when *excessive sensitiveness* (vaginismus) or nervousness on the part of the patient preclude its use, or when its introduction would be *productive of harm* (as by interfering with union after a plastic operation, or by exciting fresh hemorrhage).

There is, however, *no positive contra-indication* to the employment of the speculum, when it is deemed necessary to insert it, save the absolute impossibility of introducing it.

(3) **Varieties of Specula.**

(A) *Cylindrical Specula.*—These may be made of wood, metal, glass, hard rubber, gutta-percha, or horn.

As they reflect a good light into the vagina, they are *useful*

for purposes of inspection, and are also good for the application of medicines, for leeching or for scarification, etc.

They are *not good instruments through which to perform operations, nor to introduce the sound or probe*, especially if the uterine canal is tortuous, or if anteflexion exists.

Before introducing a speculum the finger should always be inserted into the vagina and the position of the cervix and os uteri determined, or it will probably be difficult to engage the os uteri in the lumen of the instrument. Depress the perinæum well before endeavoring to introduce it, and be careful to avoid striking the instrument against the vestibule; it should then be inserted gently with a rotary motion.

The difficulties which may be met with in making this examination are, (a) *trouble in engaging the cervix* in the field of the speculum, so as to expose the os (it may even be necessary to draw the cervix down with a tenaculum, or to introduce a sound first into the os, and pass the speculum over it); (b) *beginners often have trouble* by trying to pass the speculum beyond the line of the symphysis pubis without having previously depressed the perinæum, thus pressing the instrument against the urethral bulb and causing the patient great pain; (c) another difficulty may be due to the *rigidity of the perinæum*, or to *contraction of the levator ani muscle* from fear or from reflex causes due to the contact of the instrument; *pendulous nymphæ*, also, may cause a momentary obstruction to the passage of the speculum.

(B) *Bi- and Tri-valve Specula* are made of metal and are nickel-plated. They are *good instruments* through which to introduce tampons, or to apply medicines especially to the vagina; they are also useful for exposing the cervix and vaginal vaults, and are better than the cylindrical specula for introducing the sound, applicator or bougies into the uterine cavity.

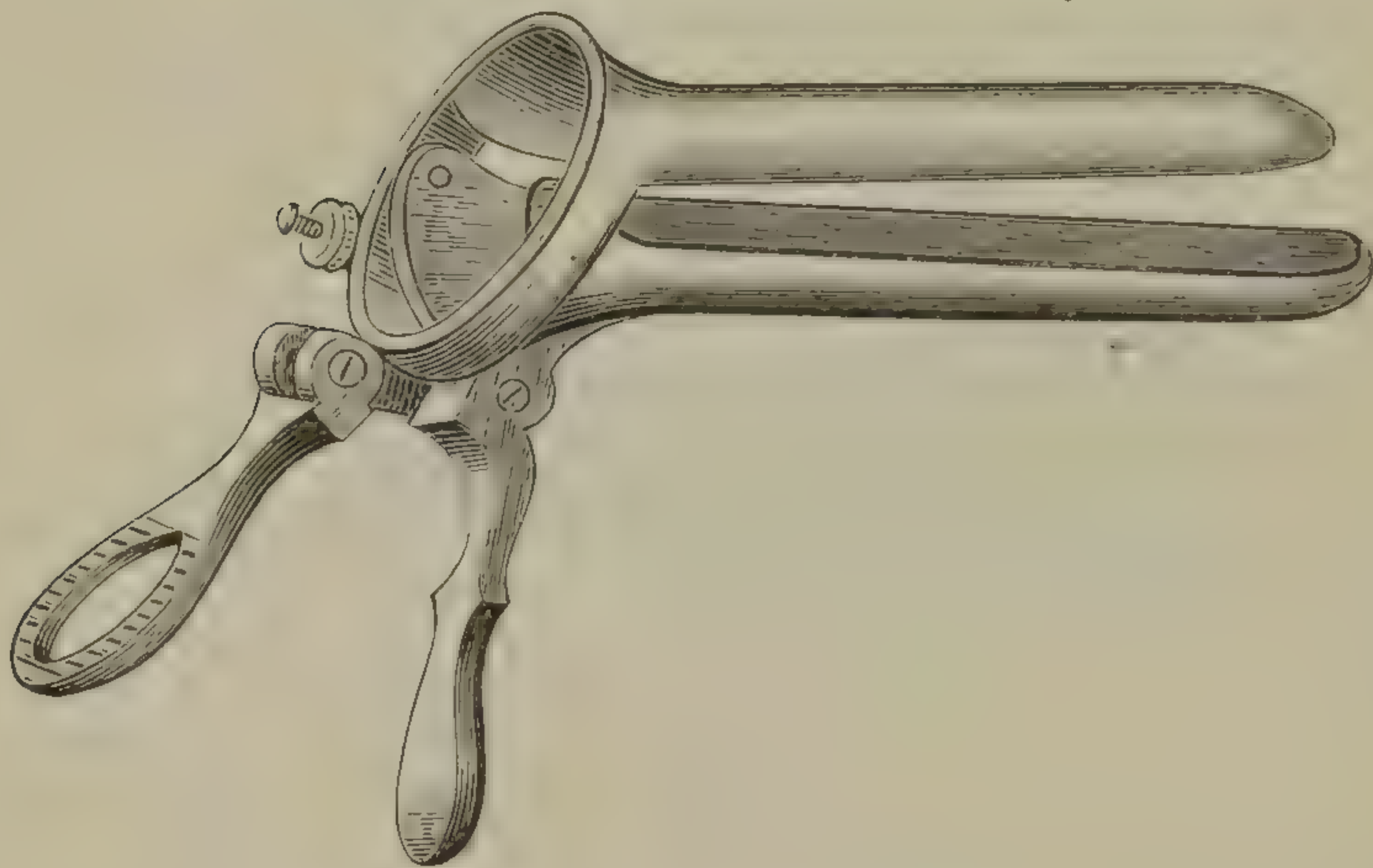
They are not good for the application of powders or of fluids to the cervix, nor for leeching the cervix.

In using a bi- or tri-valve speculum, the finger is first introduced to ascertain the position of the cervix, after which the instrument is passed with closed blades, their longest diameter corresponding to the antero-posterior diameter of the vulva.

The perinæum should be depressed, and the instrument passed downward into the vagina. When it is well in, the handles of the instrument are turned downward and the blades separated so as to engage the cervix, after which the blades are fixed with the screw. If the os does not at first become engaged, withdraw the speculum slightly, and point the blades in the direction in which the os is supposed to be.

The difficulties encountered in making this examination are as follows: *If the speculum is passed too far* before the blades are expanded, they may pass to the side, before or behind the

FIG. 13.

CUSCO'S BIVALVE SPECULUM. (*Lewers.*)

os, and push it out of the way; *if the vaginal walls are flabby*, they may fall down between the blades and obstruct the view; *when the speculum is being withdrawn*, care should be taken not to pinch the patient with the blades.

Neither tubular nor valvular specula are, as a rule, self-retaining. The bivalve exposes the vaults and the lateral vaginal walls; the trivalve, the anterior wall as well; and the quadrivalve, a portion of the posterior wall also. More than two valves are rarely required in a speculum, and are usually not advantageous, as the more valves there are the more likely is the

vaginal mucous membrane to prolapse between them and interfere with the view. These specula may be introduced when the patient is in either the dorsal or the lateral position.

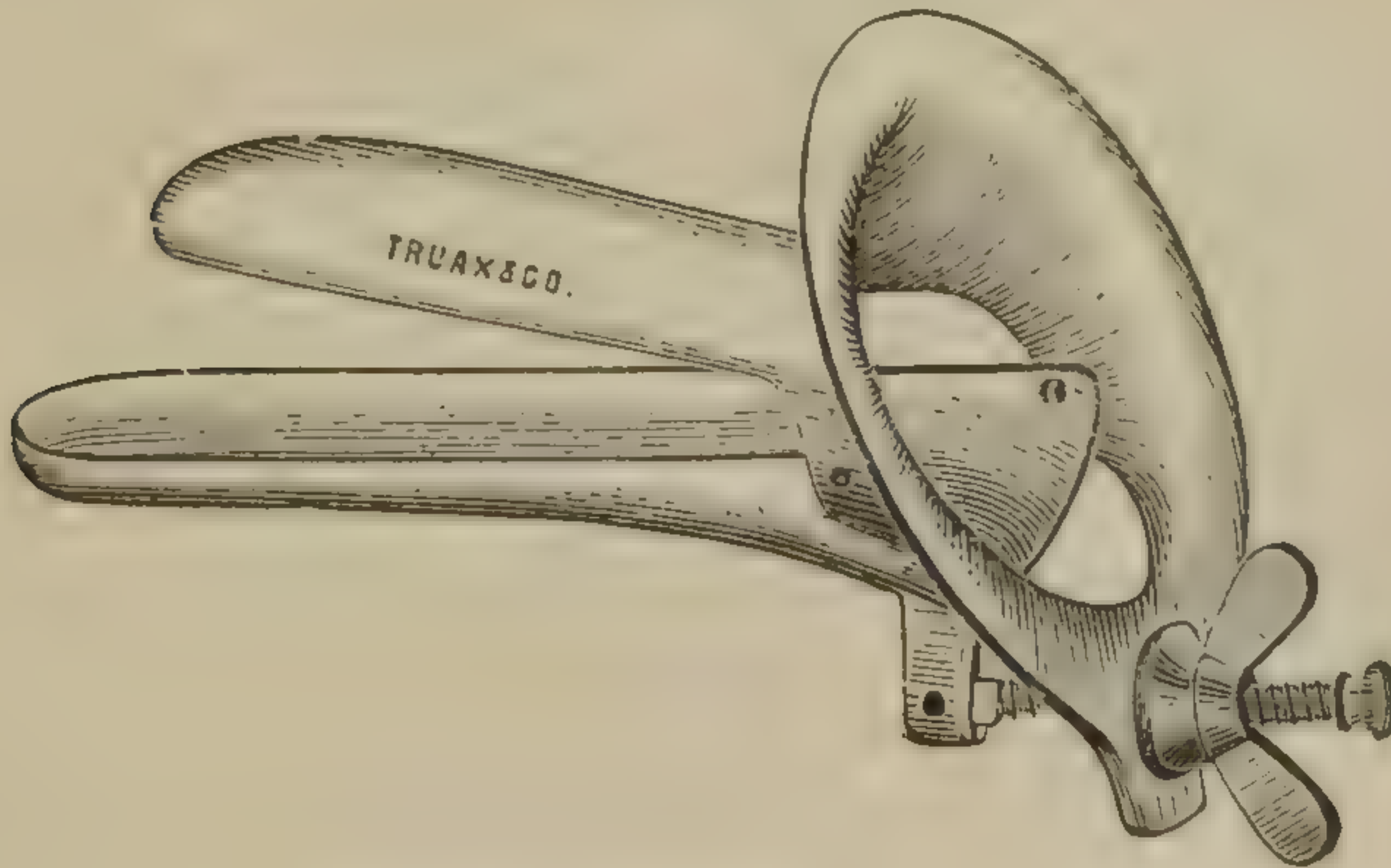
FIG. 14.



SIMS' SPECULUM. (Byford.)

(C) *Univalve, or the Duck-bill Speculum (Sims')*. To introduce this speculum the patient *must be* placed in the latero-abdominal position (to remove the intra-abdominal pressure). It acts by holding back the posterior vaginal wall and allowing air to enter the cavity, which thus distends the canal, and in

FIG. 15.



HIGBY'S SPECULUM. (Byford.)

this way its walls and the cervix are brought into view, especially when the perinæum is firmly retracted by the instrument. *This is the only speculum through which can be seen the cervix undisturbed by pressure, movable, with its circulation unim-*

peded, its os non-everted, and the uterus itself in its normal position. It is *the only speculum* which renders operations on the cervix and vagina alike easy and successful.

The objections to this speculum are that it must be held in place so that the perinæum is drawn strongly back, thus requiring the aid of an assistant. In using this speculum, also, a depressor is needed to depress the anterior vaginal wall and bring the cervix into the axis of the canal, and a tenaculum to bring forward and steady the cervix.

The following is the *method of using* this instrument: The patient lies in the latero-abdominal, or semi-prone position, her clothes being loose and well drawn away from the sacrum, so as not to interfere with the hand of the physician, who sits behind the patient, oils the instrument, and places the index finger of his right hand (if she is on her left side, or of his left hand if she is on her right side) flat in the concavity of the blade, seizing the shank of the instrument with the other fingers and thumb, while gently lifting up the labium with the other hand. The blade is then introduced, with the concavity downward, into the canal, and, when well inside, is turned so that the concavity looks forward toward the anterior vaginal wall. It is then guided along the posterior vaginal wall by the finger which has remained in its concavity, until the handle touches the perinæum, when the upper (external) blade is seized firmly with the left hand and steady traction made, not directly backward, but backward and slightly upward, so as to raise up the buttock and admit more light. The instrument is then intrusted to an assistant, who stands near the patient's sacrum and grasps the speculum firmly with his right hand, having his thumb in the concavity of the external blade, which he holds firmly with his other four fingers, and makes steady traction upward and backward, elevating the buttocks with the four fingers of his other hand. The examiner then depresses the anterior vaginal wall with the depressor, and catching the uterus with the tenaculum, which he fastens in the endocervical mucous membrane, passing it from within outward, he draws the uterus into the field of vision and steadies it in this position.

Difficulties encountered by a beginner. If the blade is carried in front of the cervix, when traction is made the cervix is carried backward and hidden from view by the instrument.

If traction is made directly backward, especially if the point of the inner blade be directed too far back, the cervix will not be exposed, but will be drawn out of sight. If the assistant directs the point of the blade too far forward, by pulling the handle too much toward the patient's head, he may pull the speculum out of the vagina.

This speculum is *very useful* as an aid to diagnosis between erosion of the os and eversion of the cervical mucous membrane. It is also useful in deciding whether the lips of a lacerated cervix can be properly approximated, and an operation for its cure successfully performed (if the lips cannot be satisfactorily approximated, cystic or areolar hyperplasia usually exists, which should be treated before the operation is performed).

Sims' speculum may also be used when the patient is *in the genu-pectoral position*, and is especially useful when it is necessary to obtain a good view of a diseased vagina, as in fistula, or in vaginitis, or as preparatory to replacing a retro-displaced uterus, or to introducing a pessary, or to operating on a vesico-vaginal fistule.

(4) What to look for when the Cervix is engaged, no matter what Speculum is used:—

(a) *The presence and character of any discharge* from the os uteri; is it thin, glairy, discolored, or purulent?

(b) *The size and color of the cervix*, which should normally be of a pale pink color, or may be purplish, or mottled; a *purple color* may mean pregnancy, the congestion of subinvolution, or the pressure of too tight a speculum, or approaching or ending menstruation; a *mottled appearance*, with small, yellow, opaque dots on a pink surface, indicates occluded follicles (*ovula Nabothi*).

(c) *The size of the os uteri*; is it normal, round, transverse, or patulous?

(d) *The edges of the os uteri*; are they smooth or fissured?

To diagnose between an eversion of a bright red and rugous

cervical mucous membrane, caused by the pressure of a speculum, and an erosion of the cervix, withdraw the speculum slightly, when, if it is the former, the mucous membrane will reinvert itself and disappear. It is not easy to make a diagnosis when deep laceration exists, and the lips are much everted and hyperplastic (so-called ulceration).

In these cases the finger is the best means of diagnosis.

If there is much lateral displacement of the uterus, especially if adhesions are present, it may be impossible to engage the cervix in the field of any speculum.

(II.) SOUND AND PROBE.

There are two kinds of uterine sounds :—

- (1) **The Flexible Sounds**, which may be either (*a*) *very flexible*, so that they will yield to the slightest obstacle (usually made

FIG. 16.



SIMS' SOUND. (Byford.)

out of soft silver), or (*b*) *those which are stiff enough to retain any shape which is given to them*, and yet flexible enough to be readily bent in any direction by the fingers. They are made of whalebone or rubber, silver, or copper plated with silver or with nickel.

- (2) **Inflexible Sounds** are such as cannot be bent, but maintain the curve given them by the maker.

Sims' flexible sound represents the first variety of flexible sounds.

It is not so generally useful as the stiffer sounds, because it is more likely to catch in the folds of the cervical mucous membrane; because a sound of soft metal is harder to introduce than a stiffer instrument, and because, following as it does every bend in the uterine canal, it gives but little information regarding the direction of the canal, or the mobility of the uterus when introduced by the touch alone. When a sound

is to be inserted into the uterus through the speculum, it is the safer instrument to employ.

Simpson's stifly flexible sound is the type of the second variety of flexible sounds, and is the one most generally used.

Probes are very thin, flexible or elastic rods made of pure silver, whalebone or pure rubber.

Sims' probe is the one most generally employed.

Thomas' hard rubber probe is elastic, and is very useful in diagnosing the presence and in ascertaining the attachments of submucous uterine fibroids.

(A) Indications for Passing the Uterine Sound.

Whenever any information can be obtained by the passage of the uterine sound, and a careful oral and bimanual examination fails to reveal any contra-indication, particularly if it is the first examination, the sound may be employed.

FIG. 17.



SIMPSON'S SOUND. (Byford.)

(B) Contra-indications.

- (1) *The uterine sound must never be passed when pregnancy is suspected, even if the woman has only missed her menstrual time by one day.*
- (2) *The sound must never be passed in acute, subacute, or even in chronic inflammation of the pelvic cellular tissue or peritoneum.*
- (3) *The sound must never be passed in acute inflammation of the uterus.*

(C) Precautions.

- (1) *Use the greatest delicacy and gentleness.* No force must be employed, either in passing, in manipulating, or in rotating it after its introduction. As a rule, the patient should feel no pain except when the tip of the sound passes the narrow internal os, or presses on the fundus, and no blood should follow its introduction except when it is necessary to work the

point through a narrow internal os, or when the mucous membrane is hyperæmic.

- (2) *If there is an obstruction to its passage* at any point which gentle manipulation fails to overcome, the attempt as a diagnostic measure should be abandoned.
 - (3) *If there is severe pain, or the patient shows symptoms of faintness or of collapse*, withdraw the sound and resort to proper restorative measures if necessary.
 - (4) *After the tip of the sound passes the internal os* it should be passed very carefully, so as to avoid giving pain by striking too forcibly against the fundus, and even running the risk of piercing the uterine wall.
 - (5) *Be very careful in moving the uterus around with the sound*, as in replacing a displaced uterus, because the mucous membrane of the fundus, acting as a fulcrum, causes more or less pain, and the operation is always accompanied by a certain amount of risk of perforation.
 - (6) *Be very careful in passing the uterine sound or probe on a patient who has recently, or still is suffering from uterine hemorrhages*, as it is liable to renew or increase the bleeding. The sound may be necessary in these cases to determine the length of the uterine cavity, or the presence of intra-uterine growths, which may cause the hemorrhage.
 - (7) *In chronic adhesive pelvic cellulitis* the sound should only be passed when the uterus is straight, the os patulous, and when the instrument passes in without the slightest difficulty.
- (D) **Dangers.**
- (1) *The passage of the uterine sound* is not infrequently followed by a *certain amount of uterine colic*, which, however, only lasts for a few hours.
 - (2) *Actual collapse* from shock may follow its employment, but is of rare occurrence.
 - (3) *Pelvic peritonitis or cellulitis* may possibly follow its use, therefore the patient should be advised to rest a few hours after this, as after other gynæcological manipulations.
- (E) **Information to be gained by the Use of the Sound or Probe.**
- (1) *Patency of the external os uteri.*

- (2) *Dimensions of the cervical and of the corporal canal, therefore of the whole uterine canal.*
- (3) *Size of the internal os uteri.*
- (4) *Sensitiveness of the internal os and of the fundus.*
- (5) *Direction and course of the canal, consequently the position of the body and of the fundus.*
- (6) *The existence of endocervicitis, or of endometritis, by the character of the discharge, if any, coming from the os or remaining on the sound or finger on its withdrawal. The passage of the sound, by opening the internal or the external os, or by straightening the canal in case of flexions, may allow retained secretions to escape.*
- (7) *The presence of intra-uterine growths may be determined by the sound or probe.*
- (8) *Actual hemorrhage occurring after the withdrawal of the sound, if it has been passed easily and gently, shows that an inflamed or congested endometrium is present, or that the uterus contains granulations, vegetations or a tumor. If associated with other pelvic symptoms and lanceolating pains, and if cachexia is present, it is probably uterine sarcoma. Normally a few drops of blood may follow even the most gentle sounding and indicate nothing.*
- (9) *The sound may also be passed to settle the diagnosis between large ovarian tumors (which seldom cause enlargement of the uterine cavity) and uterine fibro-cysts (in which disease the uterine cavity may be enormously enlarged, measuring even as much as seven or eight inches).*
- (10) *The mobility of the uterus, and consequently the presence or absence of adhesions and the remains (often obscure) of pelvic peritonitis or cellulitis.*

(F) How to Introduce the Sound or Probe.

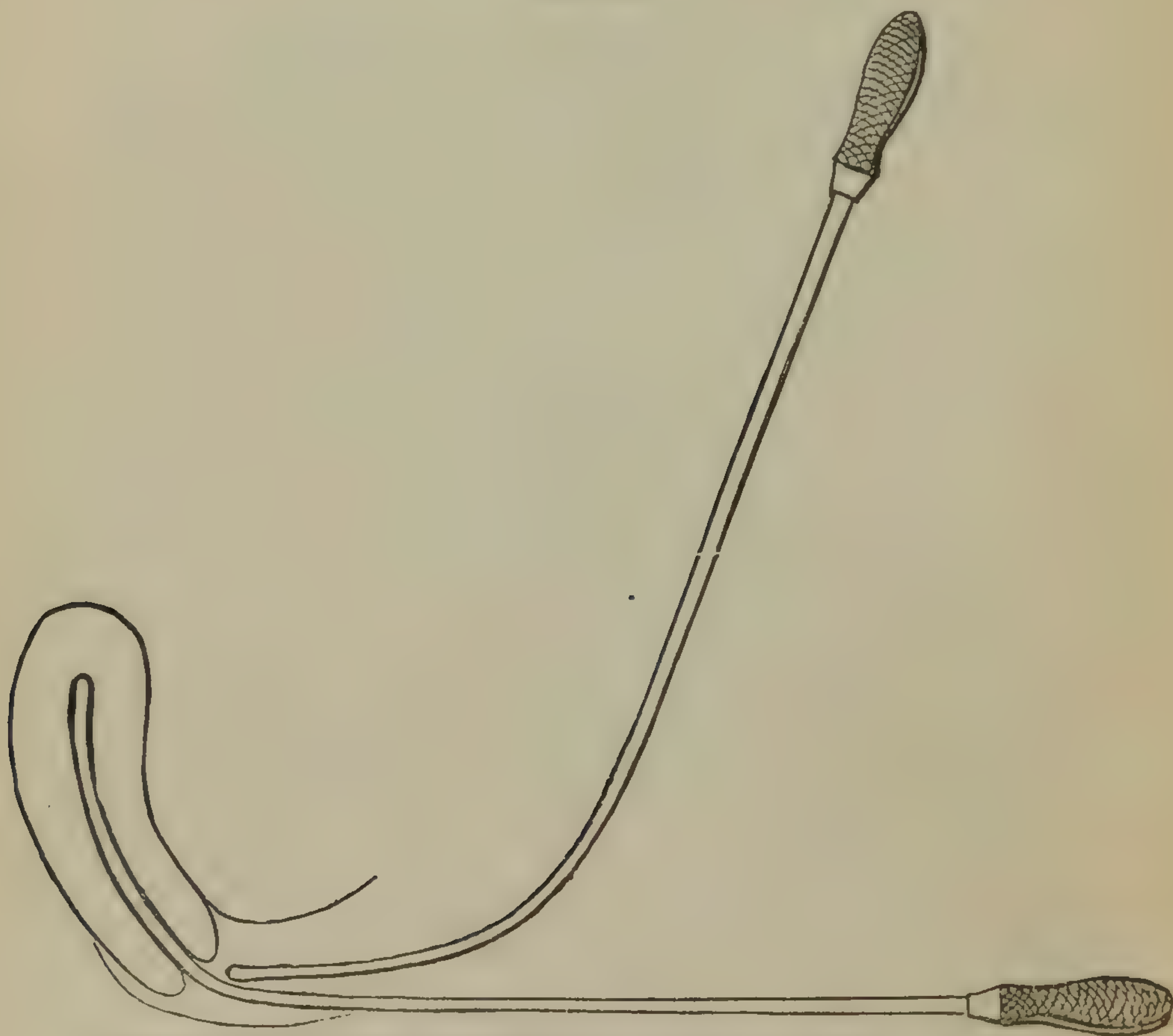
The *Sound* is better introduced by the touch and not through the speculum, as with the finger against the cervix, every movement of the sound can be felt and followed after it has passed into the uterine cavity.

The *Probe* should always be introduced through the speculum,—Sims' speculum being preferred for this purpose.

To introduce the sound the patient should be in the dorsal po-

sition; the physician grasps the sound by the handle between the tips of the thumb and of the two first fingers, like a penholder, and passes the index finger of his other hand into the vagina, with palmar surface upward, placing the tip of the finger against the posterior or lower lip of the cervix. The point

FIG. 18.



INTRODUCTION OF THE UTERINE SOUND, SHOWING THE MOVEMENT OF THE HANDLE ($\frac{1}{2}$). (*Byford.*)

of the sound is then gently insinuated between the labia, and passed with the convexity downward along the finger in the vagina, until it reaches the cervix. The point should then be very gently introduced into the os, and along the cervical canal for about one inch, which brings it into the neighborhood

of the os internum. When the tip is in the cervical canal, the middle finger is withdrawn from the handle, and the sound is henceforth managed with the thumb and index finger only. When it reaches the internal os, it meets with a slight impediment to its onward progress, which is, however, readily overcome by depressing the handle between the patient's buttocks. It is, usually, only when the curve of the uterus is not normal, as in the case of flexions, that this manipulation fails. To depress the handle the position of the fingers should be changed, so that the tip of the thumb comes above on the handle, and the forefinger is below it. When the point of the sound reaches the fundus, a soft, semi-solid resistance is felt, and the patient usually complains of pain near the umbilicus. When the sound is about to be withdrawn, the tip of the examining finger should be pressed against the sound at the os uteri, and withdrawn at the same time, thus marking the distance to which the instrument has entered the uterus, and showing the length of the uterine canal. If the digital examination has shown that retroversion exist, the sound is passed as usual until the internal os is reached, when it should be gently rotated, and the handle elevated instead of being depressed. If ante- or retro-flexion is present the sound should be bent to correspond with the probable curve of the canal, before it is introduced.

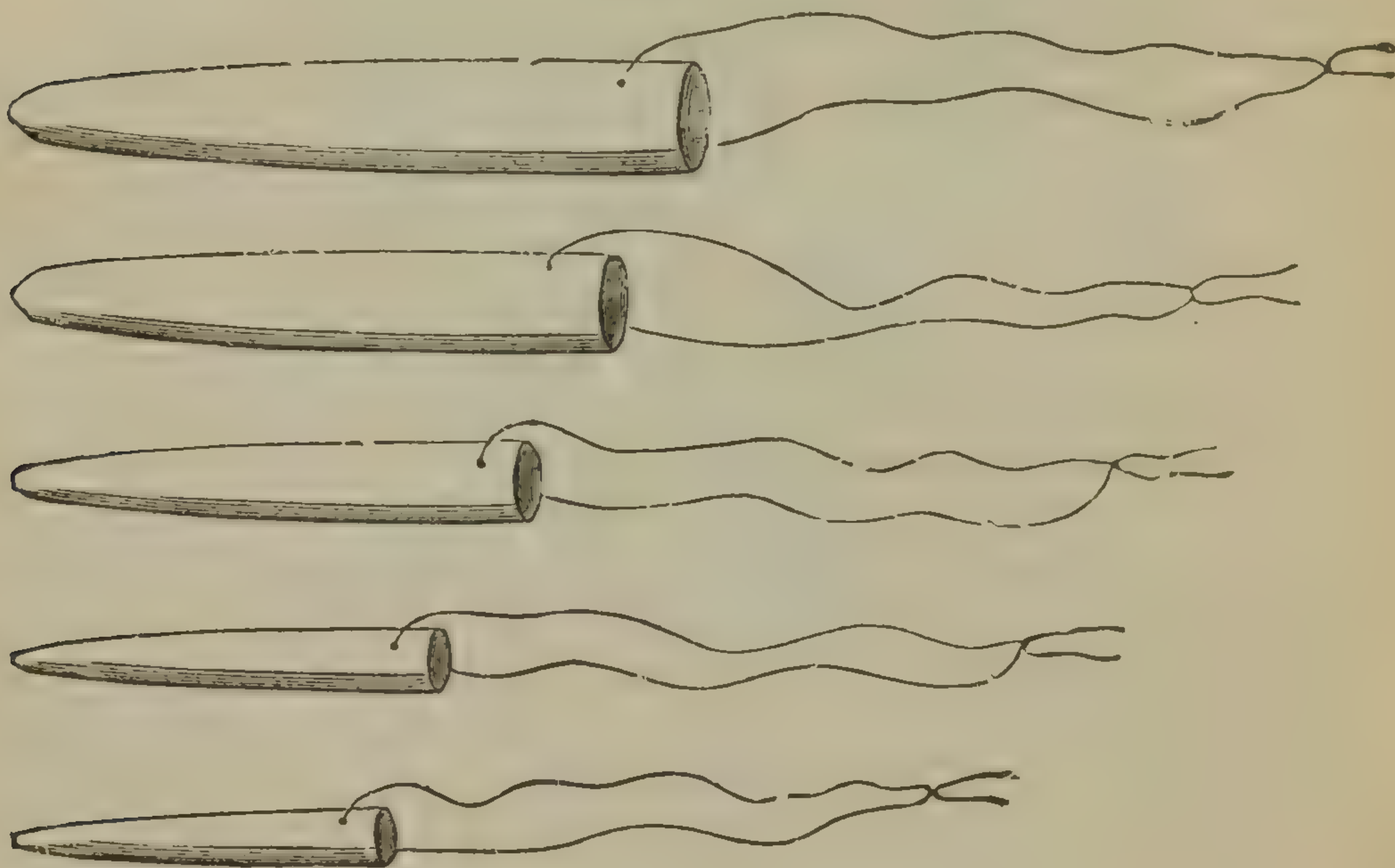
(G) Difficulties.

- (1) *Sometimes the tip is caught in a fold of the cervical mucous membrane, or at the internal os. In this case a little pendulum motion, or a rotary movement of the handle, will generally free it.*
- (2) *Sometimes in anteflexion, the uterus is so movable, that the pressure of the sound at the internal os will tilt the cervix backward out of the way. In this case, pull it forward with the finger, and push the fundus upward.*
- (3) *Beginners often have trouble, by neglecting to depress the handle of the sound when the os internum uteri is reached, or by depressing it too soon.*

(III.) DILATATION OF THE CERVIX.

When it is necessary to explore the interior of the uterus with the finger, and the canal is not sufficiently patulous to allow of its introduction, preparatory dilatation is practiced. It is also occasionally necessary to dilate in order to introduce a curette for the purpose of obtaining scrapings from the interior.

FIG 19.

SPONGE TENTS. (*Byford.*)

Dilatation as a therapeutic measure will be discussed in a different chapter.

Dilatation is contra-indicated when pregnancy is suspected and in all inflammatory affections of the uterus or of its appendages. Even the remains of an old cellulitis, or peritonitis, should make the physician hesitate before resorting to this procedure.

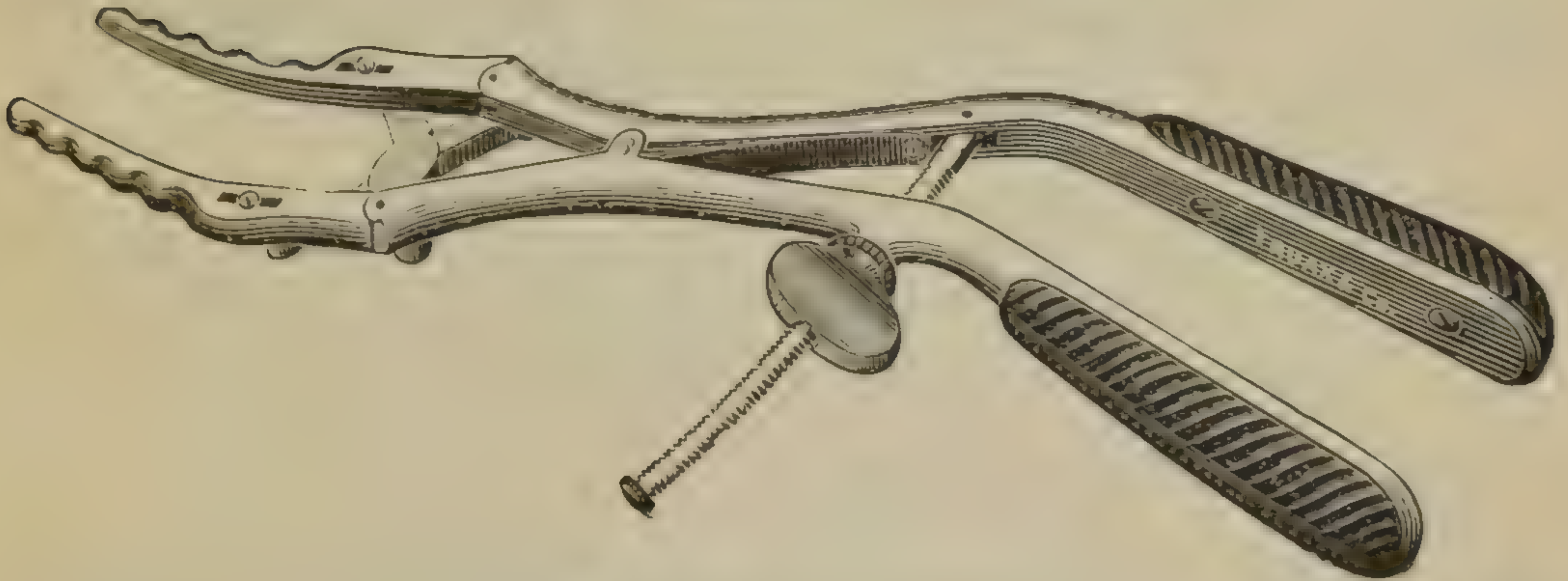
The uterus may be dilated by means of

- (a) **Tents.**—Conical substances, compressed so as to be passed into the uterine cavity, and made of sponge, laminaria, tupelo,

gentian-root or other material which, by absorbing moisture, will expand, and thus open the uterine canal;

- (b) **Metallic Dilators** (as those of Wilson, Goodell or Ellenger), whose blades are introduced closed into the uterine cavity and, being gradually separated, produce dilatation; and finally,

FIG. 20.

GOODELL'S DILATOR. (*Byford.*)

- (c) **Solid bougies** made of metal or hard rubber (as those of Hegar), of different sizes, which, being introduced successively, will dilate the canal in an hour to a size sufficiently large to allow of the introduction of the finger. The last two kinds of dilators act much more rapidly than tents. Metallic dilators (as Wilson, etc.) do not press equally on all the circumference of the neck, and hence the dilatation is not uniform.

(IV.) CURETTE.

The curette is an instrument for removing small portions of growths for purposes of examination. It may also be used for therapeutic purposes.

FIG. 21.

PROBE CURETTE. (*Byford.*)

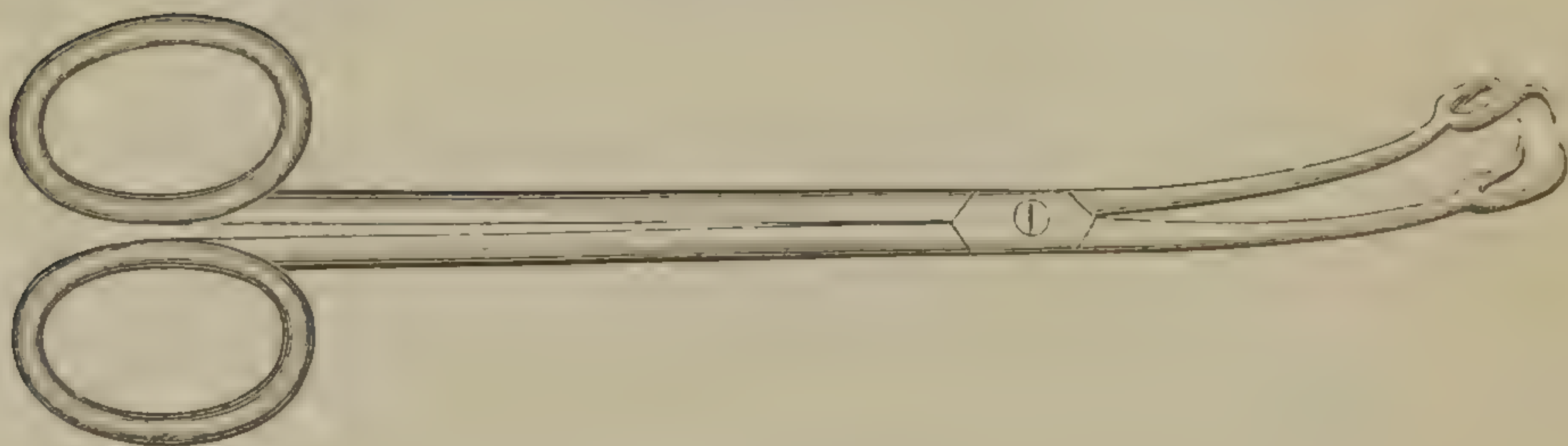
There are *two varieties* of curettes—those with flexible and those with inflexible handles. *Of the former variety*, some, like Mundé's, are made of dull wire, having no cutting edge, while others consist of a metal hoop sharpened on one edge.

FIG. 22.

THOMAS'S WIRE CURETTE. (*Byford.*)

The non-flexible instruments, of which Simon's scoops may be taken as a type, are oval or rounded spoons with a very slightly

FIG. 23.

VOLSELLA. (*Doran.*)

projecting edge, which is sharpened. Freund's irrigation-curette is similar to these, but has the handle, shaft and scoop

perforated by a canal and the extremity of the handle adapted for the attachment of the tube of a syringe, so that the uterine cavity can be irrigated and curetted at the same time.

This instrument, however, is used more for therapeutical than for diagnostic purposes.

Curette-forceps are also used for diagnostic purposes or to remove small growths or portions of the products of conception from the uterine cavity. Schultze's curette forceps is considered safer than those of Récamier.

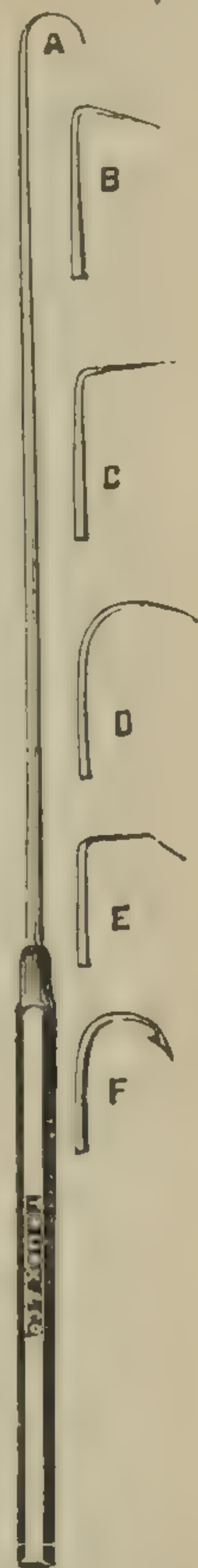
Curetting is *contra-indicated* when dilatation or the use of the uterine sound is improper, and when the walls of the uterus are so diseased and softened that perforation would probably result.

(V.) TENACULUM, TENACULUM - FORCEPS, DOUBLE TENACULUM AND VOLSELLUM FORCEPS.

These instruments are used to steady the uterus during a specular examination, or when the sound, tents, dilators or curette are to be introduced. They may also be employed to draw down the uterus, so that its surroundings and its relations to tumors, etc., in the neighborhood can be better ascertained. When employed for this purpose, *great care* must be exercised not to injure the peritoneum or ligaments by too much traction.

If pregnancy is suspected, if any acute pelvic inflammatory process is present, or if the uterus is held by peri-uterine adhesions, the employment of these instruments is inadmissible.

FIG. 24.

TENACULA.
(Byford.)

DISEASES OF THE EXTERNAL GENITALIA.

URETHRAL CARUNCLE.

This is a small, usually vividly red, sometimes pale, extremely sensitive tumor, found at the orifice of the urethra, and often causing severe pain on urination, with a frequent desire to pass water and extreme itching.

The **treatment** consists in catching the tumor with a pair of fine toothed forceps and removing it with scissors, having previously etherized the patient, or applied cocaine locally to prevent pain. As these tumors are apt to return, the base should be cauterized thoroughly with the solid stick of lunar caustic, or with nitric acid; or a small concave piece of mucous membrane on either side of the tumor may be removed and the base stitched to it.

EVERSION OF THE URETHRAL MUCOUS MEMBRANE.

This condition may be found with or without urethral caruncle, and appears in the form of a crescent-shaped red projection from the lower portion of the meatus. It may cause frequent urination with burning pain, or may give rise to no symptom at all.

The **treatment** consists in the application of astringents and cold, or of nitrate of silver, either in the form of the solid stick, or of strong solution.

PROLAPSE OF THE URETHRAL MUCOUS MEMBRANE.

This affection is caused by the straining consequent upon any of the above conditions, or from long-continued urethral or vesical congestion, or irritation, and is especially seen in anæmic or debilitated subjects.

Relaxation of the mucous membrane or hyperplasia always precedes this condition, and a loosening of the urethral attachments must occur before prolapse can take place.

The prolapsed portion becomes red and chafed and often œdematous, from the frequent wetting by the urine, as well as

from its constriction by the meatus, and retention of urine may result.

The **symptoms** are similar to those of urethral caruncle,—frequency of urination attended with pain, and on examination a vividly red, extremely sensitive protrusion from the meatus is seen, but the orifice is in the centre of the protrusion, and through it a small sound can be passed into the bladder, while in caruncle the opening surrounds the growth.

The **treatment** in the early stages consists in replacing the prolapsed mucous membrane and endeavoring to keep it in place by removing all complications which may exist, by the use of mild astringents, and by insisting that the patient should remain in bed. If it is impossible to replace it, a catheter should be passed into the bladder and the mass removed, either by the thermo-cautery or by ligating it close to the meatus, around the catheter. Or the prolapsed portion may be removed by the knife or scissors, and the edges of the wound stitched together, taking care that contraction of the meatus does not result from the operation.

INFLAMMATION OF THE LABIUM MAJUS.

This may follow injuries or arise spontaneously, especially about the time of the menstrual period.

The **symptoms** are those of inflammation. The disease runs a rapid course and frequently terminates in suppuration.

The **treatment** is that of inflammation generally. If pus forms, evacuate it by a small incision, and wash out the abscess cavity thoroughly with a 1-2000 solution of corrosive sublimate, and dress antiseptically.

INFLAMMATION OF THE VULVO-VAGINAL GLAND.

The **causes** are, extension of inflammation from the vulva or from the vagina, which may be either of common or specific origin. It may also result from traumatism.

The **symptoms** are those of inflammation. An abscess of the gland often forms, which points between the labium majus and labium minus. The left side is most frequently affected.

It should be **treated** on general principles. If abscesses continue to recur, excise the gland, or lay it freely open and cauterize its surface.

CYST OF THE VULVO-VAGINAL GLAND.

The cyst may involve the duct only; or the gland itself may be affected.

Symptoms.—A hard swelling, the size of a walnut, and without any signs of inflammation, is seen in the situation of the vulvo-vaginal gland.

Treatment.—Endeavor to evacuate the cyst by pressure; and if this does not succeed, make an incision into it and dress antiseptically. Should the fluid reaccumulate, lay the cyst freely open and cauterize it, or cut out a portion of the cyst wall.

HERNIA INTO THE LABIUM MAJUS.

There are *two varieties* of labial hernia.

In anterior labial hernia the bowel, omentum or ovary descends through the inguinal canal and external abdominal ring, by the side of the round ligament, into the labium.

In posterior labial hernia, which is much rarer, the bowel, omentum, ovary, uterus or oviduct descends by the side of the vagina, through an opening made in the pelvic roof, the muscular and fibrous tissues being torn apart.

The **diagnosis** is identical with that of hernia in the male.

The **treatment** consists in reducing the hernia, and retaining it in position by means of a suitable truss or pessary.

HYDROCELE OF THE ROUND LIGAMENT

Consists in a collection of fluid either in the—

(1) *Peritoneal pouch* which comes down with the round ligament in the inguinal canal (in which case the sac may connect with the abdominal cavity, or the communication between them may have been obliterated);

(2) *In the tissues of the round ligament* itself; or

(3) *In the labium majus* external to the sac of the round ligament.

The **diagnosis** is easy. A fluctuating swelling of the labium or inguinal region, which is transparent when the physician looks through a stethoscope placed against it at a strong light held on the opposite side of the swelling, and which possesses no symptoms of inflammation, nor succussion on coughing or other sign of hernia, can only be a hydrocele.

Treatment.—Occasionally, pressure has caused absorption of the fluid, inflammation, and obliteration of the sac. A more common and more certain procedure is to aspirate the fluid, and inject tincture of iodine or pure carbolic acid, making pressure over the abdominal ring if the sac communicates with the peritoneal cavity, to prevent the passage of the fluid into the peritoneum. A third method of treatment is to cut a piece out of the sac and stitch the margins to the skin.

TUMORS OF THE LABIUM MAJUS

are not of frequent occurrence. The most common are fibromata and myomata. They are usually pedunculated.

The **treatment** consists in enucleating them if not pedunculated ; or in ligating the pedicle and cutting off the growth below the ligature if sufficiently pedunculated to allow of this procedure.

HYPERTROPHY OF THE NYMPHÆ.

Sometimes, especially in hot climates, the nymphæ become excessively elongated, projecting far beyond the labia majora, and occasionally giving rise to great inconvenience. When this is the case, the operation of *nymphotomy, or circumcision in the female*, is performed. This consists in grasping the nymphæ with a pair of forceps, having previously etherized the patient, and cutting off the redundant tissue either with the knife or scissors. The cutaneous margins of the wound are then approximated by means of sutures, and the part dressed antiseptically.

PAPILLOMATA OF THE LABIA OR OF THE VULVA.

Condylomata occurring in these situations are not always of specific origin, nor do they only occur in the uncleanly, as they

are often found in persons in perfect health, and who are accustomed to frequent ablutions.

They may be *sessile*, and are often *multiple*. They frequently increase rapidly in size during pregnancy, to diminish as rapidly after parturition, and may even shrivel up and entirely disappear.

The **treatment**, if the patient is not pregnant, consists in removing them, either by excision and the subsequent application of a caustic, by a rubber band tied tightly around them, which, by gradual pressure, will cut its way through ; by the thermo- or galvanocautery ; or by the application of picric or of chromic acid.

CARCINOMATA AND SARCOMATA OF THE VULVA.

These are rare as primary diseases of the vulva, and when present are usually secondary to disease of the vagina. They will be mentioned more fully hereafter.

The **treatment** consists in thorough extirpation with the knife and the application of caustics, after which the edges should be brought together as rapidly as possible.

ERUPTIONS OF THE VULVA.

The vulva, like other portions of the integument, is the seat of numerous eruptions, as *eczema*, *herpes*, *prurigo*, etc.

ECZEMA consists of small vesicles or an inflamed condition of the skin, from which a serous fluid exudes, which forms crusts on the surface under which pus often accumulates. If the disease becomes chronic, the integuments are thickened and dry, and the elasticity of the skin is diminished or lost.

HERPES, which is common at the menstrual period, or during pregnancy, consists of vesicles, unaccompanied by any signs of inflammation, and is of short duration, although the vesicles often rupture, and scales result.

PRURIGO consists of small papules appearing in clusters.

The **treatment** consists in absolute cleanliness, alkaline washes to remove the scales, and protecting the parts from friction or other irritation.

In addition to this, if the disease be *acute eczema*, powdering the

• surface with bismuth subnitrate, in the moist stage, or the application of some mild unguent if the integuments be dry, or of lead-water and laudanum, if much heat and inflammation is present, will be of advantage.

In *chronic eczema*, a solution of silver nitrate (gr. xx-f ʒj) once or twice a week answers better.

HEMORRHAGE FROM THE VULVA

may result from a wound, or from rupture of a varicose vein of the labia or vestibule. The treatment consists in cleansing the wound, and compressing the bleeding point by a pad and bandage, complete rest, and if necessary, suturing the wound so as to include the bleeding point, or even ligating the vessel.

VULVISMUS OR VAGINISMUS

is a spasmodic contraction of the muscles of the pelvic floor,—not of the sphincter vaginæ muscle alone. It is seen alike in single and in married women, and is caused by violence in sexual intercourse, as when, in a newly married couple, there is some difficulty in entering the vagina, and repeated attempts set up an irritation, resulting in reflex contraction whenever the penis strikes the anterior margin of the perinæum. It is sometimes seen after childbirth, caused by some injury to the pelvic floor during parturition; sometimes it is the result of local disease of the parts, or it may be due to some disease of the spinal cord.

The spasm of the muscles is usually accompanied by pain, often severe, and rendering the accomplishment of the sexual act not only difficult, but impossible.

Two varieties of this disease are usually described: *vaginismus inferior*, where the muscles of the pelvic outlet alone are involved, and *vaginismus superior*, where the levator ani muscle participates in the contraction; the last is a rare affection, and particularly that form where the latter muscle only is at fault. This variety sometimes comes on at the end of the sexual act, and the penis may be grasped by its contraction and retained in the vagina for some time.

The **treatment** should be directed against the cause: thus, if any local disease is present it must be removed, abstinence from sexual congress enjoined, and sedative washes and injections employed. If an irritable hymen is the cause of the trouble, the patient should be etherized and the hymen dissected out. If no inflammation is present, gradual dilatation of the vagina, by colpeurynters or other means, do good. To relieve the pain, cocaine may be used either in solution, painted on the part, or inserted into the vagina in a suppository. Used in the latter manner shortly prior to sexual intercourse, it not only renders the act possible, but may directly lead to a cure, partly by robbing intercourse of its terrors for the patient, and partly, either by accustoming the parts to the presence of the penis, or by the changes which will occur in the genitalia should the woman become pregnant.

COCCYGODYNIA.

This is a painful affection of the coccyx, manifesting itself by excruciating agony, experienced whenever the coccyx is touched or when the levator coccygis muscle contracts. Although it is principally a disease of women or of children, it is sometimes also seen in men.

The **chief cause** of this affection is injuries sustained to the coccyx during childbirth, or other traumatism; yet it may follow cold and exposure, producing either a rheumatic affection of the muscles and fibrous tissues in the neighborhood of the coccyx, or disease of the bone itself.

The **treatment** will depend upon whether the bone is or is not diseased. In some cases it may be relieved, when the bone is not diseased, by dividing the tissues subcutaneously down to the bone. Other cases require the removal of the bone itself. This operation is performed by making an incision in the median line down to the bone. Lateral flaps are then raised and dissected back until the bone itself is exposed, when the attachment of the tissues to its apex are carefully divided, and from thence by a pair of scissors or a blunt-pointed bistoury the tissues inserted into its sides as far up as the base. The bone is now turned backward and its articulation divided. Palliative measures should be tried before surgical interference is thought of.

INJURIES TO THE PERINÆUM.

The perinæum, as we have seen, is the posterior and lower portion of the structures which close the pelvic outlet, and aids materially in supporting the pelvic viscera, and in maintaining them in their normal position. When, therefore, it is torn, relaxed, or otherwise injured to the extent of interfering with this function, the pelvic viscera, being deprived of their support, tend to become displaced downward, or even to protrude through the vulval orifice, these changes in position occurring gradually—not immediately after the accident—because the perinæum is not the only support which retains them in place. Rectocele, cystocele, urethrocele, descensus or prolapse of the uterus, or even complete procidentia, one or all commonly occur after such injuries.

The principal injuries to the perinæum occur during childbirth, and consist in a more or less complete rupture of the structures which form it; thus, all the structures at the outlet may be torn through, from the vulval orifice to the fibres of the sphincter ani, which may even be slightly involved (*partial perinæal rupture*); or the sphincter ani may also be completely torn through, so that the vulval and anal openings are one (*complete rupture*); or the perinæum may be perforated by the head, the vulval and anal orifices not being involved at all (*central perinæal rupture*); or, again, the muscles of the perinæum may be separated subcutaneously, without any injury to either the skin or the vaginal mucous membrane.

In the latter cases, the parts will appear to be uninjured, but a careful examination will show that the perinæum consists only of skin and mucous membrane. The perinæum will sag downward, and rectocele will almost inevitably occur.

The obstetrician should never leave his patient after delivery until he has satisfied himself, by a careful digital examination and inspection of the parts, that no lesion of the perinæum has resulted from the labor, nor until he has repaired any damage which may have resulted.

The treatment of a recent tear should be undertaken immediately after the completion of the third stage of labor. The parts should be thoroughly cleansed with an antiseptic solution, and the

raw triangular surfaces stitched together in the following manner: The sutures (silk-worm gut, catgut or silver wire) are passed first from the cutaneous surface of the denuded triangle, and are carried as deeply as possible through the tissues of one side and then back through the opposite side to the skin, care being taken to have them completely buried in the wound throughout their entire course. When a sufficient number of stitches have been inserted at distances of about half an inch, vaginal stitches may be introduced in a similar manner, although they are not usually necessary. The vaginal sutures are tied first, and afterwards the cutaneous sutures. *When a complete laceration exists*, rectal sutures of catgut are inserted first, then vaginal, and lastly cutaneous stitches, which are tied after the last suture is in place, in the order of their insertion. The urine must usually be drawn off after this operation for the first few days, and the bowels kept open daily by small doses of castor oil, or by small and repeated doses of Rochelle salts. The stitches may be removed on the eighth or ninth day.

When a central laceration is present, it must be converted into a partial laceration by making an incision from its posterior margin into the vulval orifice. It should then be treated in the same manner as a primary partial laceration.

If the laceration is of long standing, the operator, in his endeavor to restore the perinæum and its function, must constantly bear in mind the anatomy and shape of the part (*i.e.*, that it is a triangular body of which the skin forms only the base and that the apex extends upward between the rectum and the vagina for a distance about equal to the space between the fourchette and the anterior margin of the anus). Remembering this, he should adapt his operation to secure the best results, either denuding the cicatrized surfaces and coaptating them with sutures, or performing a flap-operation, as he thinks will best suit the individual case.

The time selected for a secondary operation will vary with the case. If it is an incomplete laceration, it may be operated on at any time after the lapse of six weeks from the birth of the child, but if the laceration has been complete, it is better to wait until after the first menstrual period (Hildebrandt), because by that time the parts have thoroughly undergone the process of involution.

The operation will vary somewhat according to the complete-

ness of the laceration. In case the *laceration is partial*, and there is no sagging down of the perinæum, nor any tendency to rectocele, the removal of the cicatrical tissue in the form of two spherical triangles, the apices of which extend upward toward the junction of the labia minora with the labia majora, while their bases are united in the median line, will be ample ; *but if the laceration is greater in extent or deeper*, the apices of the triangles must extend further forward and upward and more of the vaginal mucous surface must be removed, as the object in view is to secure union of the divided muscles, especially of the sphincter vaginæ. If there is *much rectocele* the denudation of the vaginal side of the triangle must be increased, and even a small triangular portion of the mucous membrane in the median line of the vagina (and at the summit of the rectocele), its base applied to the upper (vaginal) surface of the triangles already denuded, may be removed with advantage, and will, when its lateral sides are approximated by sutures, draw back the rectocele and keep it in place.

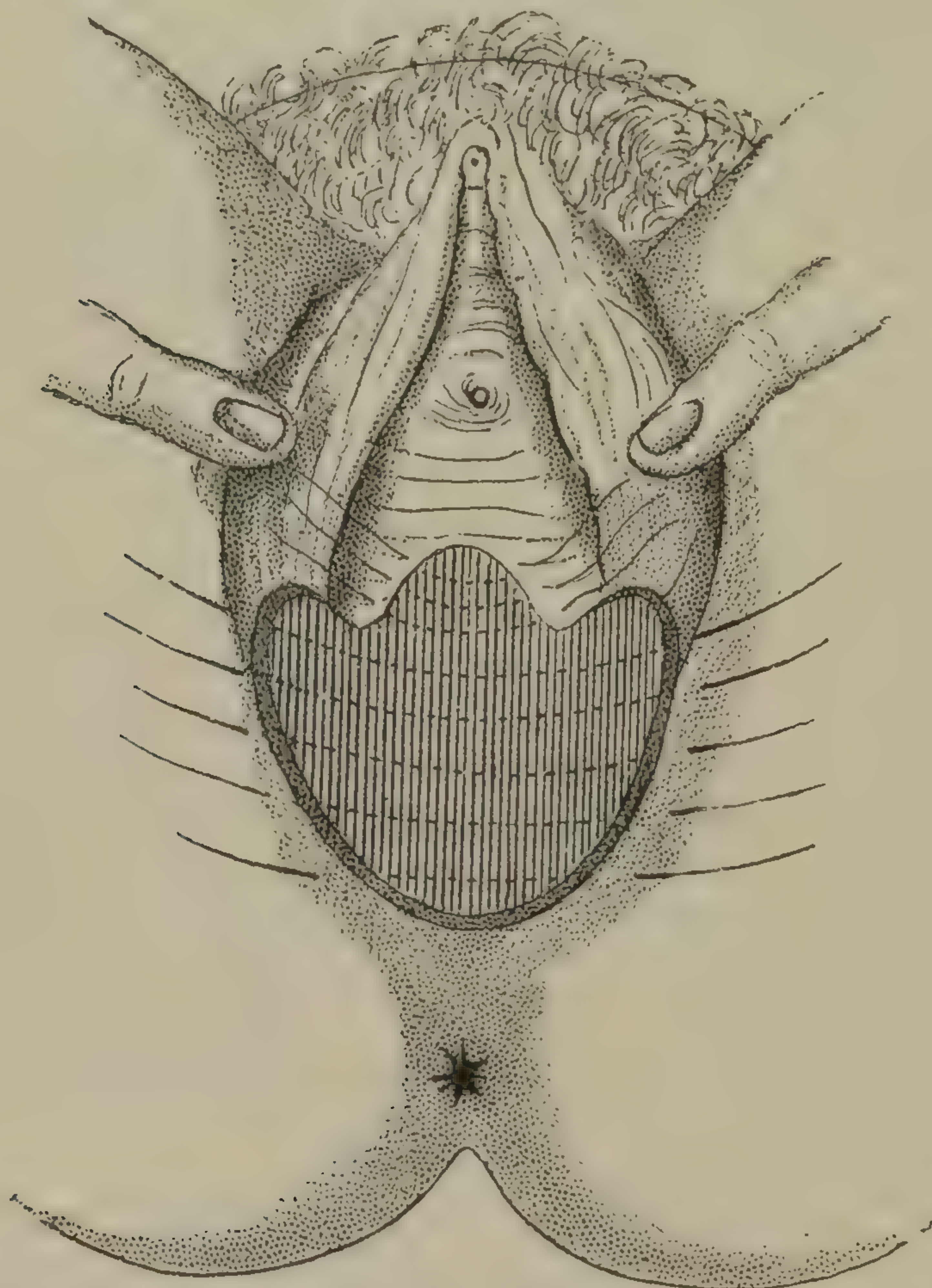
The operation is performed in the following manner: The patient should have had her bowels thoroughly evacuated by the administration of castor oil given for several days before the operation. She should, of course, eat no breakfast on the morning of the operation, and should be loosely clothed, as if for bed. The contents of the bladder must be evacuated just prior to the administration of the anæsthetic. Having been fully etherized she is placed in the gluteo-dorsal (lithotomy) position, her limbs being firmly flexed and held in this position by the assistants, and her buttocks brought down to the edge of the bed in such a manner that the perinæum will overhang the bed, and the operator be free and untrammelled in his movements.

The parts are now shaved if necessary, and are thoroughly cleansed with an antiseptic solution,—indeed, the more attention paid to antiseptic precautions in these operations, the better the chance of a thorough union.

The labia are now separated by the assistants and stretched widely apart, and the operator, seated between the woman's thighs, marks out in his mind the extent of tissue to be denuded. In the case of a beginner it is often better to outline the surface to be

denuded with a scalpel before beginning the operation. *Denudation* may be accomplished in several ways, but no matter what way is selected, it is important to begin at the lower (cutaneous) surface first, and freshen the tissues inward and upward, as other-

FIG. 25.



APPEARANCE OF THE MODIFIED TRIANGULAR DENUDATION AS VIEWED BETWEEN THE SEPARATED LABIA, WITH STITCHES PASSED (Zweifel). (Byford.)

wise the blood flowing downward from the denuded surface above will interfere with the operation. The tissue should be removed in one continuous strip, for then the operator is certain that the entire surface is freshened, and that no islets of cutaneous or

mucous tissue remain on the denuded surface to interfere with the union. The tissue is now grasped with a toothed-forceps or with tenacula and removed, either with a scalpel or with curved scissors.

If scissors are employed, those of Emmet will be found most useful, as they are curved both on the flat and edge, and are in pairs, one to be used with the right, the other with the left hand. The gynæcologist seizes the tissue to be removed as high on the left side as the denudation is intended to extend, and with the right-hand scissors removes a strip at the muco-cutaneous junction, to a similar point on the right side, leaving the end of the strip attached. He then takes the other pair of scissors and continues the denudation in the reverse direction and repeats this process until the surface is entirely freshened, the tissue having been removed in a continuous strip. Instead of this procedure, an ordinary pair of straight or slightly-curved and pointed scissors may be used, the operator making a slight puncture with a tenotome at the muco-cutaneous junction in the median line, and introducing the points of the scissors, divides the tissues subcutaneously to the extent which he wishes to denude. He then cuts the margin of the tissue which he thus separated and removes it in one piece in the form of a triangle. After the surface has thus been freshened the finger must be carefully passed over it, to ascertain if any islet of mucus or of cutaneous tissue has been overlooked, and if so it should be carefully removed.

The surface is now thoroughly sponged, all hemorrhage arrested by ligatures, if necessary (or by including the bleeding point in the sutures), and any irregularities of the margins which might prevent coaptation of the two sides carefully removed.

The sutures are now introduced. They may consist of pure silk, silkworm gut, catgut, or silver wire, and should be thoroughly aseptic. In introducing them, strong and long needles are used, which are held in the grasp of needle forceps. The first suture should be introduced into the skin close to the margin of the wound at its lowest part, and passed upward and outward deeply in the tissues, curved around in front of the rectum, and brought down deeply through the tissues of the other side, emerging through the skin at a point corresponding to the point of ingress.

Other sutures are now introduced one above the other as deeply as possible, without wounding the rectal mucous membrane, and the apices of the triangles are separately sutured, the sutures being vaginal. The wound is now cleansed of all clots and shreds of tissue and the sutures tightened and tied, or shotted. The parts are dusted with powdered iodoform and the woman kept in bed, on a fluid diet, for several days. The sutures may be removed at the end of two weeks.

If a *flap operation* is performed, two triangular flaps are dissected up (but left attached along their upper or vaginal margins), whose boundaries are the median line from the upper or vaginal end of the laceration to its lower or perinæal extremity, and from this point in a curved direction, to a point on the labium majus of either side as high up as it is desired to denude. These flaps are trimmed and approximated in the median line by superficial sutures, after which the deep sutures are inserted, as in the former operation, and the denuded surfaces brought together.

The same general principles hold good for operations in cases of *complete rupture of the perinæum*, with the exception that great care must be taken to denude thoroughly and approximate closely the divided and retracted ends of the sphincter ani muscle, which will be detected as two little dimples on either side of the rectal wall. The rectal sutures are introduced first, and should consist of No. 2 catgut. They are introduced by means of an Emmet needle at the margin of the rectal mucous membrane, carried upward and outward in the tissues for about a quarter of an inch and then withdrawn, carried across the rupture to a corresponding point on the opposite side, again inserted and withdrawn at the margin of the rectal mucous membrane opposite to the point where they were first introduced. The introduction of the first suture is difficult, and if not properly inserted incontinence of fæces may return after the operation. The needle should be inserted at the inner and lower point of the denuded surface, carried outward around the end of the retracted muscle in such a manner that it will lift it up to its fellow when the sutures are tied, then carried inward through the recto-vaginal septum, and finally around the end of the muscle on the other side, and out at a point opposite to that at which it was originally inserted.

The rectal sutures are tied in the rectum before the perinæal

sutures are introduced, the latter being inserted in the same manner as in case of incomplete rupture.

When a *flap operation* has been determined upon, an incision is made from the apex of the laceration in the recto-vaginal septum (*S*) outward on either side to the inner surface of the labium a little above the margin of the anal skin (*1*); a second incision is made from the posterior margin of the sphincter ani

FIG. 26..

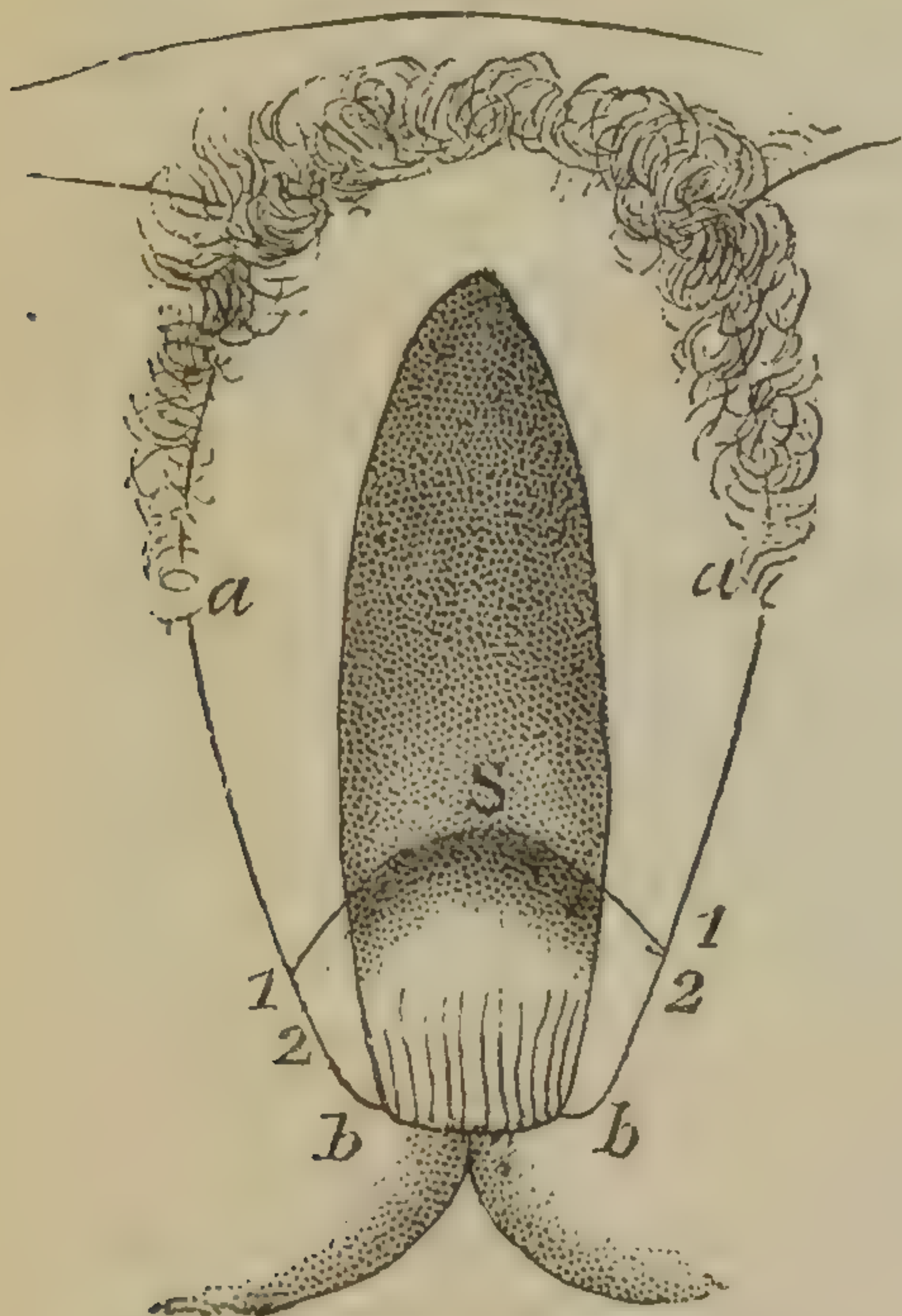


FIG. 27.

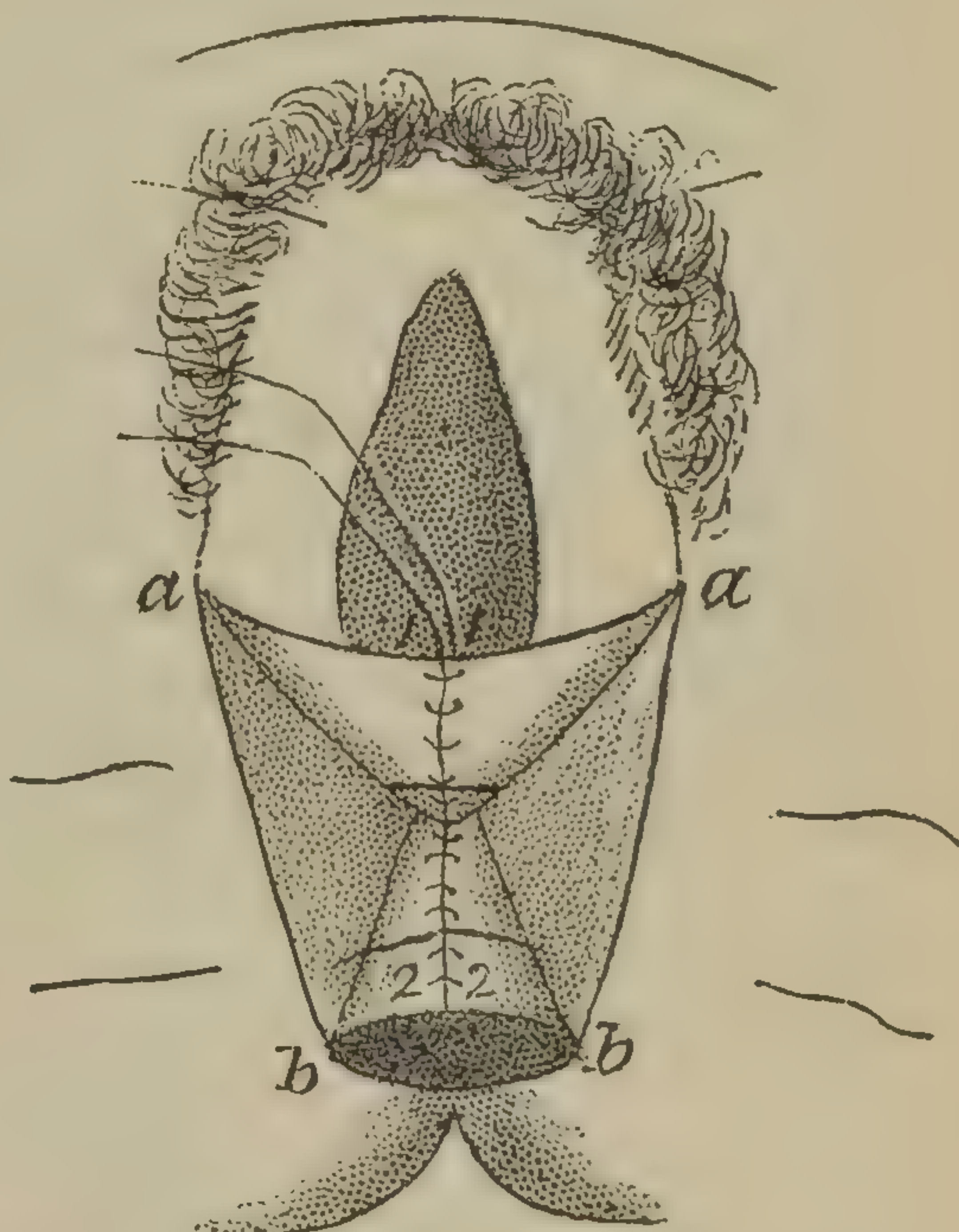


Fig. 26.—Lines of Incision of the Triangular Flap Operation applied to Lacerations extending into Rectum. (*Hart and Barbour.*)

a 1 S, flap to be raised and united to its opposite to form posterior vaginal wall; *b 2 S*, flap to be raised and united to its opposite to form anterior rectal and anal wall.

Fig. 27.—Flaps raised and Sutures passed in same Operation. (*Hart and Barbour.*)

(*b*), upward along the edge of the laceration and parallel with the vulval orifice, to the labium of either side as high as it is desirable that the denudation should extend (*a*). Two flaps on either side are raised, the two upper flaps (*a 1 S*) being dissected off from below upward, but left attached at their upper margin (*a S*) while the lower flaps (*b 2 S*) are dissected from above downward, remaining attached at their lower margins (*b S*).

These flaps are now trimmed, brought together in the median line (the upper flaps uniting at 1, 1, S, while the lower are turned downward and unite at 2, 2, S), and united by superficial sutures. The freshened surfaces are afterward united by deep sutures in the manner already described.

Lawson Tait's operation is a modification of the flap operation. He uses sharp scissors, splitting the recto-vaginal septum into thick flaps without removing any tissue whatever. These flaps are turned into the rectum and vagina without any superficial sutures. His sutures surround and bring together large masses of tissue. The anterior or upper suture is first inserted. The needle is entered near the median line from the vagina, is carried outward into the deeper structures, then forward and inward, and is brought out at the upper margin of the rectal flap; it is then reinserted at a similar point in the opposite rectal flap and carried outward, and then downward and inward, in the deeper structures, emerging near the line of union at a point opposite to that at which it was first introduced. This suture is not seen at all in the rectum, and only the knot appears in the vagina. If it is necessary, a second suture may be introduced, but never more than two. The remaining sutures close the cutaneous wound in the usual way. Silk sutures are used, and are left in place for two weeks. This operation gives good results in deep perinæal lacerations.

VULVITIS.

Vulvitis may be either catarrhal, follicular, diabetic or aphthous.

(I) CATARRHAL VULVITIS.

(1) **Cause.**—Want of cleanliness; gonorrhœa; exposure to cold; extension of inflammation from other parts; masturbation.

(2) **Symptoms.**—Those of ordinary catarrhal inflammation, viz., swelling, redness, heat, pain, and dryness of the parts, followed by increased discharge.

(3) **Treatment.**—The parts must be kept perfectly clean and warm hip-baths should be freely employed. Sedative applications of lead-water and laudanum often afford much relief in the very acute stage. As this stage subsides, dusting with bismuth subni-

trate and keeping the labia separated by salicylated or borated cotton, and, later on, the free use of astringents is useful.

If the disease is of specific origin (see vaginitis), the application of a solution of corrosive sublimate (1-2000) brushed over the part, or applied on a piece of lint, or the application of carbolic acid (2 per cent.), or silver nitrate in strong solution, will give better results.

(II) FOLLICULAR VULVITIS.

Is that form where the sebaceous follicles are involved, the glands become enlarged and hard and their ducts are seen resembling minute pin-holes.

The best **treatment** consists in warm sedative applications, warm baths and alkaline washes.

If the muciparous follicles are involved (which is often the case if gonorrhœa is present), solutions of silver nitrate give better results.

(III) DIABETIC VULVITIS.

Is dependent on the presence of the *penicillium*,—a fungus developed from the sugar in the urine, and spreading from the orifice of the urethra to the vulva. The parts become hard and dry and of an intensely red color. The affection is attended with intense and very troublesome itching.

In **treating** this affection, the general condition of the system, of which it is only a symptom, must be borne in mind and treated. In addition to this, moist applications do some good, particularly solutions of the salicylates. Cocaine will, to some extent, relieve the obstinate itching.

(IV) APHTHOUS VULVITIS.

This is a disease of childhood following the exanthemata, or any debilitated condition of the system.

Symptoms.—Little grayish, slightly elevated vesicles are seen, varying from the size of a pin's head to that of a pea. These rupture and leave deep ulcers with hard borders, which tend to spread and are slow to heal. The inflammation may extend downward to the perinæum and anus, or upward to the groin, and not infrequently leads to gangrene if not energetically combated.

In **treating** this affection, constitutional remedies are fully as

important as local means. The patient must be placed under the most favorable hygienic conditions, and have an easily digested, but highly nutritious, diet. Cod-liver oil, quinine and iron should be administered and the most scrupulous local cleanliness insured. The parts should be dusted with iodoform every day, and the labia separated by a plug of borated or corrosive cotton. If gangrene occurs, the slough should be removed and the surface freely cauterized with fuming nitric acid, while internally, stimulants, quinine and opium must be administered.

IMPERFORATE HYMEN.

Imperforate hymen usually causes no trouble until puberty, although sometimes, immediately after birth, there may be violent pains and straining which will pass away when an incision is made in the hymen.

Usually the first indication occurs at the first menstrual period, when all the symptoms of menstruation are present, but no flow appears. As time goes on the accumulated blood is dammed back into the uterus, which becomes distended, and even into the oviducts, and rupture with fatal peritonitis usually occurs if some means are not taken to relieve the patient. Sometimes (rarely) the hymen yields to the pressure and the fluid is evacuated externally. *The symptoms* are violent attacks of pain recurring periodically at the menstrual periods, without any external flow; the uterus enlarging periodically; fluctuation, and the absence of the positive signs of pregnancy. Inspection shows an imperforate hymen, which bulges outward from the vulva, and is thinned and dark in color, often resembling a child's head.

In **treating** this affection the indication is to evacuate the fluid pent up in the vagina, but there are two dangers in so doing which should be borne in mind. In the first place, as long as the air is excluded from the fluid, no decomposition can take place, but as soon as an incision is made and the air gains access to the fluid decomposition sets in and septicæmia may result, even when the drainage is free. Secondly, the uterus may have been so distended, that the sudden withdrawal of the fluid will leave it in a paralyzed condition; it may lack the power to contract, and severe hemorrhage may ensue.

It is therefore better, in cases where the uterus and tubes are much distended, to make only a very minute opening in the hymen, keep the patient perfectly quiet and allow the fluid gradually to drain off. After the uterus has regained tone and the fluid has been partially evacuated, enlarge the opening by a free crucial incision, wash out the uterus with an antiseptic solution and make it contract by compression of the fundus.

DISEASES OF THE INTERNAL GENITALIA.

ABSENCE OF THE VAGINA.

When no vagina is present, it is the duty of the gynæcologist to ascertain whether the uterus and ovaries are likewise absent. The presence of ovaries may be inferred from the general development of the woman, and the usual changes which occur at puberty, and they can often be discovered on recto-abdominal examination. The uterus can be felt on rectal examination, or by conjoined manipulation through the rectum and abdomen; or by a careful exploration with the finger in the rectum and a sound in the bladder; or, if the case is still in doubt, the urethra may be dilated and the finger introduced while a finger of the other hand is inserted into the rectum. If the uterus or ovaries are absent some eminent authorities teach that the gynæcologist should not make a vagina.

While this is undoubtedly true if the woman be single, yet if she be married it is probably best to operate if possible and if the woman and her husband wish it done, for otherwise the woman will most probably lead a wretched life, and her condition will cause her much unhappiness, even if it does not eventually lead to estrangement between her husband and herself.

If therefore the operator find that there is *enough tissue* between the rectum and the bladder he had best *operate*. The finger should be passed into the rectum and the sound into the bladder, to act as guides. A transverse incision is then made midway between the bladder and the anus, an inch to an inch and a half in length, extending through the skin and subcutaneous tissues, and, by the index finger inserted in the wound, a passage is gradually torn through the connective and muscular tissues to the cervix uteri.

Any vessels which may have been divided are ligated and the wound plugged to prevent any subsequent hemorrhage, as well as to prevent union of its edges. *If the tissue is too scanty* to allow of this operation, the uterus may be punctured through the rectum or bladder to make a vent for the fluid, or a laparotomy may be performed and the ovaries and oviducts removed.

ACQUIRED ATRESIA OF THE VAGINA.

These cases are much more rapidly fatal, if left to themselves than when the atresia is congenital, as rupture and death usually results in about a year, while in the latter cases, death does not occur for at least three years in the majority of instances.

The **cause** of this affection is inflammation or sloughing of the vagina, usually occurring after labor.

The **treatment** is the same as when the atresia is the result of malformation. If the oviducts are distended with fluid, the incision should be small and the retained fluid should be evacuated gradually, as in case of imperforate hymen.

ADHESIONS OF THE VAGINAL WALLS.

In this affection bands of tissue are formed as the result of adhesive inflammation, of sloughs or ulceration of the vagina, either from ordinary causes or of specific origin, which unite the walls of the vagina to each other. Ulceration from the pressure of an ill-fitting pessary, or from a pessary too long worn in the vagina, may result in this trouble to a greater or less degree.

The **treatment** consists in gradually dilating the bands, with or without prior incision.

FOREIGN BODIES IN THE VAGINA.

The bodies most commonly found in the vagina are pessaries, but all kinds of foreign bodies are sometimes met with, such as substances introduced with a view of preventing conception or for purposes of masturbation.

The **symptoms** will vary according to the size of the body,

the length of time it has been retained, and the amount of irritation and inflammation it is exciting.* A phosphatic deposit is apt to coat any foreign body which is retained for some time.

The **diagnosis** is easily made from the history and by digital exploration.

The proper **treatment** is to disinfect the vagina thoroughly, and to remove the foreign body in whatever manner it can best be done. If they are small and sharp, as fragments of glass, they may be picked out with the thumb and finger; if large, the vulva may have to be incised, the substance broken up if possible, without injury to the woman, or the forceps applied to it; if it is coated with phosphatic deposit or roughened, great care must be taken not to injure the vagina during its extraction. After its removal the vagina must be thoroughly antisepticized, especially if ulceration is present.

GENITO-URINARY FISTULÆ.

Definition.—Genito-urinary fistulæ are abnormal communications existing between either the bladder, urethra or ureters on the one hand, and the vagina on the other, or between the ureters and the uterus.

Cause.—Devitalization of the tissues, due either to prolonged pressure of the child's head during labor; to short and very severe pressure, especially if the bladder be full; to the pressure of an ill fitting pessary, or ulceration from any cause.

Symptoms.—There is a constant dribbling of urine, which may not come on immediately after labor, but generally is present by the time the woman begins to walk about; inflammation of the external genitalia occurs, and phosphatic concretions form on the rugæ of the lower vaginal wall and on the vestibule. Cicatrices may form in the vagina, preventing the examiner from

* The author has removed a hard-rubber pessary which was said to have been retained for twenty three years continuously, which had not caused ulceration, and which was not corroded nor encrusted with any deposit. The only symptom of its presence was a profuse muco-purulent catarrh. The vulva and vagina had undergone senile changes, and the pessary had to be cut in three pieces before its removal was possible.

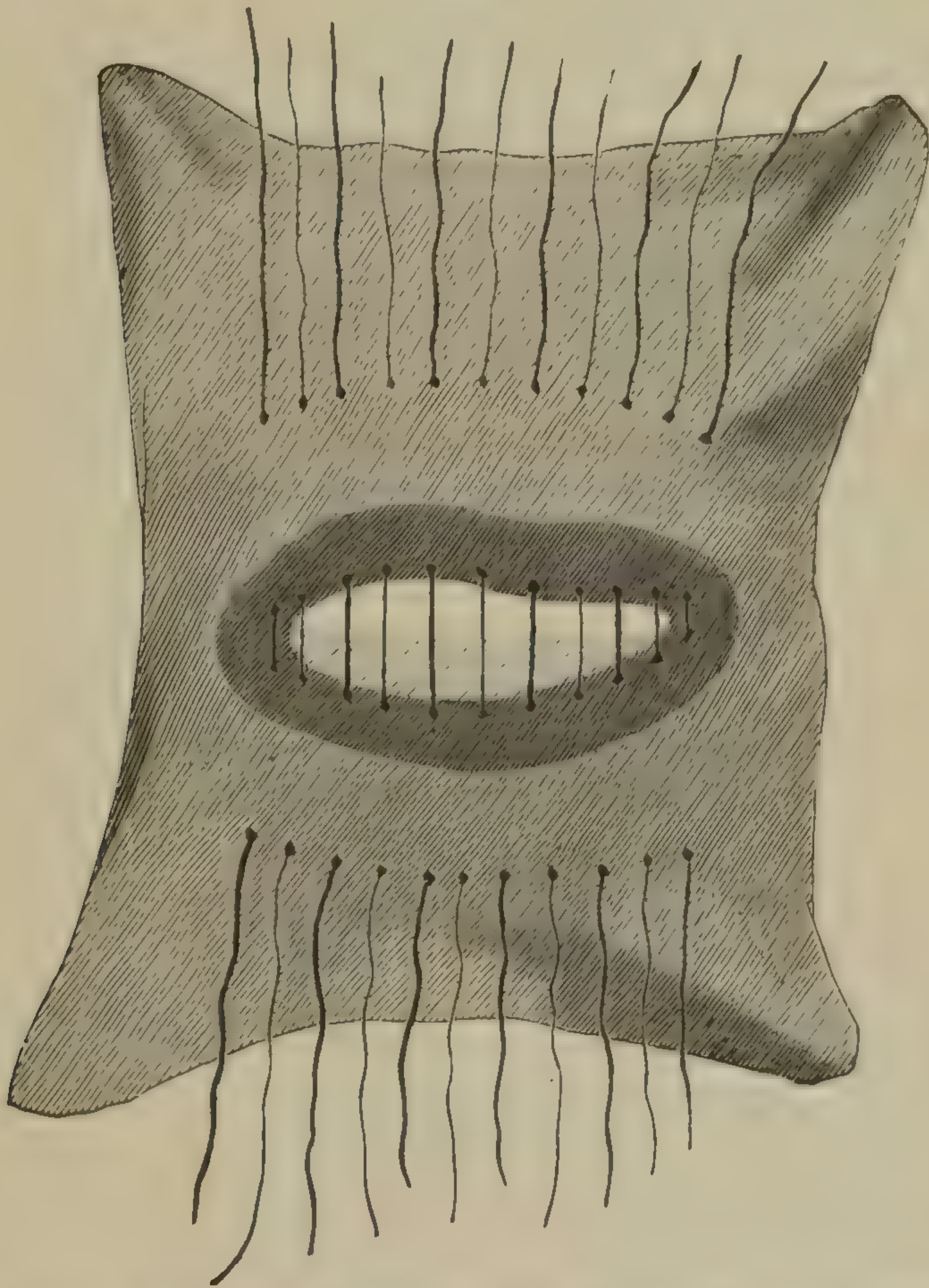
obtaining a good view. There is an offensive urinous odor about the patient.

Diagnosis.—If the fistula is large, it may be detected by the finger on making a vaginal examination. Pass a probe into the urethra or bladder and endeavor to find the opening, or place the woman in the dorsal or in the semi-prone position, expose the anterior vaginal wall and search for the opening. If these means fail to detect it, distend the bladder with warm milk, watching the anterior vaginal wall to see where it escapes. If it escapes from the cervix uteri, it is a vesico-uterine fistula. If the urine escapes in little jets from the upper part of the vagina near the uterine neck, it is a case of uretero-vaginal fistula, and, as the kidneys act alternately, in case this is suspected let the woman sit on a commode without voluntarily passing her water for a certain length of time, and then removing to another vessel, let her pass what water may have accumulated in her bladder in the meantime; if one ureter is in communication with the vagina the amount of water in the two vessels will be about equal.

Treatment.—The external inflammation must first be relieved by thorough cleanliness, warm baths, the application of astringents, and the employment of carbolized or borated unguents (borated mutton suet makes a good application) to protect the surface from the irritation produced by the constant flow of water over it. In warm weather, if the ointments are unpleasant, dusting the surface with lycopodium, which adheres readily and is not wetted by water, will be found a pleasant and efficacious substitute for the unguents. The general health must be attended to at the same time, and tonics, good food and plenty of fresh air be prescribed. Any strictures which may have formed as the result of the inflammation should be divided and the vagina dilated. After the parts have thus been restored as nearly as possible to a healthy condition, an operation should be performed for the cure of the fistula. The bladder and rectum having been emptied in the usual manner, the patient is etherized and placed either in the lithotomy or in the semi-prone position, as may best suit the convenience of the operator. The margin of the fistula is then caught up with a tenaculum or toothed forceps, and freshened with a scalpel or scissors in such a manner that the denuded surface is beveled at the expense of

the vaginal surface, the tissue being removed down to the vesical mucous membrane, which is left intact. If it is possible, it is a very good plan to remove the tissue in an entire piece, or to cut the fistula out entirely, as then there can be no doubt that its mar-

FIG. 28.

THE FISTULA WITH EDGE PARED AND THE SUTURES PLACED. (*Byford.*)

gins are entirely denuded. The freshened surfaces are brought together by means of sutures (either of chemically pure silk, properly antisepticized, or of silver wire), which are introduced about a quarter of an inch apart, and are inserted half an inch from the margin of the freshened surface on the vaginal side to the edge

of the mucous membrane of the bladder, which, of course, must not be wounded by the needle. These sutures are tied or twisted, and allowed to remain for ten or twelve days, when they are carefully removed. Before tying the sutures the operator should carefully wash out any blood cots which may be present in the bladder. The patient is kept in bed until the sutures are removed, when, if the wound is entirely healed, she may get up and gradually resume her accustomed duties. The urine must be drawn off for the first twenty-four hours, after which she can usually evacuate the bladder when she desires to do so. Opium should be given after the operation if much pain is experienced. The bowels should be carefully moved by an enema on the third day.

Complications and their Treatment.—In cases of long standing, *the urethral walls sometimes grow together*, thus occluding the canal. In this case the finger should be inserted through the fistula into the bladder and the urethra opened, prior to the operation, by gradually working through from the outside to the finger with a groove director. *If the urethra is entirely destroyed*, it may be necessary to make a new one, by turning down lateral flaps from the vaginal mucous membrane. This operation may have to be repeated several times before it is successful. *If the vesical mucous membrane protrudes through the fistula*, interfering with freshening of the edges, replace it and keep it in place during the operation by a sponge placed in the bladder, but be careful to remove the sponge before closing the wound.

If there does not appear to be enough tissue to close the wound, draw down the uterus with tenacula, when the consequent relaxation of the vaginal walls may allow the difficulty to be overcome. *If the fistula is close to the uterine insertion* and cannot be otherwise closed, the edges may be pared in the usual way, and the cervix being similarly treated, may be inserted into the wound and retained by sutures. *If a vesico-uterine fistula exists*, the uterus may be carefully dissected from the bladder until the fistula is reached, which may then be closed in the usual manner, or the cervix may be divided down to the fistula, which may then be operated upon. *In cases of uretero-uterine fistulæ*, nothing is of much avail.

RECTO-VAGINAL FISTULÆ.

This condition occurs much less frequently than vesico-vaginal fistulæ, and is less commonly the result of pressure during labor, than of abscesses or of injury with instruments. It is much less serious in its consequences than the foregoing affection, as the fæces, if cleanliness is observed (and it is much more easy to be cleanly with an intermittent discharge such as the fæces, than with a continuous discharge as the urine), do not cause the same amount of irritation and inflammation.

The **treatment** consists, in recent cases, in promoting healthy granulations, in keeping the bowels at rest for four or five days at a time by opium, and then moving them by a saline cathartic, and in paying the most scrupulous attention to cleanliness. *In cases of long standing*, where the margins of the fistula have healed, it is necessary to freshen them in the same manner as in vesico-vaginal fistula, beveling the edges from the vaginal surface so that there will be no traction on the rectal mucous membrane when the stitches are applied. The sutures are introduced as in the operation for vesico-vaginal fistule, and the bowels prevented from moving for ten days, when they may be opened by a saline cathartic, aided by a careful enema of sweet oil. The stitches may then be removed.

PROLAPSE OF THE VAGINA.

This affection may occur with or without prolapse of the uterus ; it may be a simple prolapse of the anterior, or of the posterior wall of the vagina ; or the entire vagina may be completely prolapsed ; the bladder, or the rectum may share in the prolapse of the vaginal walls, and usually do, if the prolapse is of any duration.

Causes.—The chief causes of these conditions are loosening of the vaginal attachments, laceration of the perinæum and pressure on the vagina from above by tumors, or by the neighboring organs ; or traction exerted from below.

Pregnancy and parturition, therefore, play an important part in vaginal prolapse, although it may be seen in old nulliparæ where the vaginal tissues are much relaxed, and even in children who are poorly nourished.

Symptoms.—The prolapsed portion of the vaginal mucous membrane, if it protrude outside the vulval orifice, becomes dry and often excoriated, especially if pregnancy should take place, when it may give rise to great discomfort. In uncomplicated cases it usually causes few if any symptoms.

If the bladder or rectum is also displaced, as generally occurs when the trouble is of any duration, symptoms due to the malposition of the viscus will manifest themselves; thus if there is a cystocele, there will be straining and often great difficulty in passing urine, the patient sometimes having to assume all kinds of attitudes or to insert their finger and press back the projecting mass before the water can be voided; if a rectocele is present, there is often difficulty in evacuating the bowels, followed by a sensation as if the rectum were still full, and frequently by tenesmus.

Diagnosis.—*On digital examination* the vaginal wall is found to be displaced downward, and, if no tumor is present which prevents, can be easily replaced. If there is a *cystocele* as well, an elastic tumor is seen to protrude from the vulva when the patient bears down, and a bent uterine sound introduced through the urethra into the bladder, passes downward into the protrusion, and can be felt by the finger through its walls. A *rectocele* may be diagnosed by the introduction of the finger into the rectum, when it will readily pass into the protruding mass.

Treatment.—*In simple displacements of the vagina*, or when the coëxisting cystocele or rectocele are very slight, a cure may sometimes be effected by replacing the prolapse and maintaining it in place by a simple soft rubber ring, or other pessary, or by astringent tampons, until the mucous membrane and other tissues have time to consolidate and contract. *In other cases*, restoring the perinæum is sufficient to prevent a recurrence of the trouble. If, however, there is a *rectocele of any size*, it is better to denude its crest and introduce sutures at the same time that the operation for perinæal laceration is performed, in the manner previously described. In cases of marked cystocele, denude a circular portion of the mucous membrane and pass a silk suture completely around the circle, carrying it in and out of the mucous membrane alternately (Stoltz) about one-eighth of an inch from the edge of the denuded surface, thus inverting the cystocele. The sutures are to be left in

for eight or ten days. *If cystocele is complicated by prolapse of the uterus*, Emmet's operation may be performed. The uterus is first anteverted by the finger and kept in this position by a sponge probang while the woman is being placed on her side, and Sims' speculum is being introduced. Two points are then found by means of tenacula, one on either side of and a little behind the anterior lip of the uterus, and about half an inch from it, which can be brought together in front of the cervix without undue tension. These points are denuded of mucous membrane to the extent of one-half of an inch square, as is also a surface in front of the uterus about an inch long and half an inch wide. A silver suture is then passed under each of these freshened surfaces, being brought out through the mucous membrane between them, and by twisting, they are brought together in the median line in front of the cervix. This imprisons the cervix in the posterior vaginal vault, and gains a lateral support from the pelvic fascia. When the suture is tightened, two folds are seen to have been formed on the anterior vaginal wall, extending in the shape of an ellipse, from the approximated surfaces to the neighborhood of the vaginal outlet. These are to be turned inward, their edges denuded and their opposite margins united by sutures placed about one-fifth of an inch apart. The woman should be kept in the recumbent position for two or three weeks, and the water drawn off regularly for the first few days. This, as well as the other operations on the internal genitalia, must be conducted with strict antiseptic precautions.

VAGINITIS.

Inflammation of the vagina may be *catarrhal*, *granular*, or *gonorrhæal* in character. The second variety occurs chiefly as a complication of pregnancy.

CATARRHAL VAGINITIS.

Causes.—This disease may occur from irritation, due to the presence of some foreign body, as a pessary which has been retained too long, or which does not fit the vagina; from traumatism, as in violent sexual intercourse, or other injury; or from struma (especially seen in children), or syphilitic disease.

Symptoms.—*If acute*, there are more or less violent symptoms of inflammation, accompanied by a discharge, which, if the inflammation is very acute, may be of a greenish-yellow color.

If chronic, the symptoms of inflammation will not be marked, and the discharge will usually be more creamy in color and in consistence.

Treatment.—*When acute inflammation* is present, rest in bed must be insisted on, the patient must use warm hip baths and warm mucilaginous injections, to which a mild alkali may often advantageously be added. *As the acute symptoms subside*, astringent injections, as cupric sulphate or silver nitrate (gr. ij–iv to fʒj), mercuric chloride (1–2000 or 4000), or alum may be used with advantage. *In children*, injections of warm borax-water and penciling the parts at night with iodoform is the best treatment. *When struma or syphilis* is suspected, internal remedies must never be neglected: thus, in children the administration of the iodide of iron, or, in syphilitic cases, of the iodide of potassium, are necessary, combined with good hygiene and proper diet.

GRANULAR VAGINITIS.

Causes.—This form of vaginitis is rarely seen except in pregnant women.

Symptoms.—Are those of acute vaginitis.

Diagnosis.—On inspection, the vaginal mucous membrane is found bathed with a profuse, creamy, purulent discharge, projecting through which are minute, brilliant red points, which are hypertrophied and inflamed papillæ. When the finger is introduced into the vagina, a sensation of roughness, somewhat like a nutmeg grater, is experienced.

Treatment.—The best treatment consists in cleansing the mucous membrane from the discharge, and rapidly penciling the surface with a strong solution of silver nitrate, followed by an application of vaseline or of glycerin, which will allay the pain. A solution of corrosive sublimate may be used instead. This treatment should be followed by a course of tonics, good hygiene, cleanliness, and mild astringent injections.

GONORRHŒAL VAGINITIS.

Symptoms.—Those of common vaginitis, but more severe, and often accompanied with much burning on urination, from specific inflammation of the urethra, and with a discharge of greenish pus, denoting the acuteness of the inflammatory action.

Diagnosis.—The greater severity of the symptoms; the burning and smarting of urination, and the presence (frequently) of the *gonococcus* in the discharge, are the diagnostic points.

It is sometimes difficult to differentiate strumous vaginitis in a child, from gonorrhœal vaginitis, but these are usually cases of suspected rape, and where this crime has been perpetrated, the dilatation of the canal and the bruising of the parts will bear testimony to the fact.

Treatment.—The same treatment should be pursued as in catarrhal vaginitis; especially should the vagina be thoroughly cleansed by copious warm water injections, followed by injections of corrosive sublimate solution (1-4000). Pain on urination may be treated by rendering the urine less irritating, for which purpose the alkalies may be used, as in gonorrhœa of the male.

TUMORS OF THE VAGINA.

(1) CYSTS OF THE VAGINA.

Causes.—Cysts of the vagina may be formed *by occlusion* of the *vaginal glands* themselves; by occlusion of the *vulvo-vaginal glands*, or from a *pervious condition of Gærtner's canal*, occluded above and below (in these cases the cyst will be longitudinal and often of large size, running up in the vaginal wall toward the cervix uteri). Cysts may also form from *distention of the lymphatic vessels*, or from the *occlusion of an ununited portion of Müller's ducts*, or from *cystic degeneration of thrombi*.

Treatment.—*If the cyst is pediculated*, it should be cut off; *if it is not*, it should be incised freely and cauterized, or a large piece should be cut from the cyst wall, so that its margins may not unite until it has granulated from the bottom; or the cut margins of the cyst-wall may be united to the vaginal mucous membrane by stitches.

(2 and 3) LIPOMATA AND FIBROMATA.

The former are exceedingly rare. *The latter* are sometimes seen, resembling the fibrous tumors of the uterus, but being less firm.

Situation.—They are most commonly found on the anterior wall of the vagina, then on the posterior wall, and least frequently on the lateral walls.

Treatment.—If they are pediculated, ligate the pedicle, and, if large, cut off the tumor below the ligature; if non-pediculated, make an incision over the tumor, enucleate it with the fingers and the handle of the scalpel, and close the wound with sutures, having ligated any bleeding vessels;

(4) MALIGNANT DISEASE OF THE VAGINA.

Any form of carcinoma or of sarcoma may occur in the vagina, either as a primary affection, or, more commonly, as secondary to disease of the uterus, or of the perinæum; in the former case, the posterior, in the latter the anterior wall is most frequently affected.

Diagnosis.—The character and history of the growth, the nature of the discharge, the hemorrhage and the pain, leave little doubt of the nature of the disease, and the microscopical examination of the scrapings, will settle the diagnosis.

Treatment.—Remove the diseased tissue entirely and thoroughly if possible, and, having protected the surrounding tissue with cotton saturated in a solution of sodium bicarbonate, apply to the raw surface a solution of bromine one part, iodine two parts, crystallized carbolic acid three parts, and alcohol four parts, which will act as an antiseptic, caustic and styptic.

DISEASES OF THE UTERUS.

Diseases of the uterus may be classified under the headings of (I) deviations in position; (II) deviations in function; (III) deviations in structure.

I. DEVIATIONS FROM THE NORMAL POSITION.

The normal position of the uterus has been sufficiently described in speaking of its anatomy, development, and the methods of investigating its diseases.

As it is a movable organ, its position is constantly changing, due to the amount of distention of the neighboring organs, and even to the changes in the position of the woman herself.

It is also liable to permanent change in position, due to changes, inflammatory or otherwise, in the surrounding tissues. Thus it may be either elevated or depressed, moved bodily forward or backward or to either side, *without changing the direction of its axis, without altering the relations which exist between the body and cervix.*

The organ may also be rotated on its axis, so that without altering the relations of the body to the neck, the fundus may be further forward, or further backward than it should be in the normal condition.

As the uterus is composed of soft, pliable tissue, it is liable also to *changes in curvature*, and thus various flexions, forward, backward, or to either side are often found.

A temporary change in position is not considered as a displacement; it is only when such a condition persists that it is regarded as abnormal.

ELEVATION OF THE UTERUS.

This is not a disease, but a symptom, and *is due* to enlargement of the uterus, which is of such extent as to preclude the possibility of its remaining in the pelvis (as during pregnancy); to the attachment of some large tumor either to it or to the ovary (as an ovarian tumor with a short pedicle, or a large uterine fibroid); or to large

tumors or collections of blood in the vagina, which may push it up.

The **treatment** of this displacement is the treatment of the condition on which it depends.

ANTERIOR, POSTERIOR OR LATERAL POSITIONS.

The entire uterus may be drawn by adhesions, or pushed by tumors out of its normal position in any direction, without altering the relation of its body to its neck, or causing any deviation in the line of its axis.

The **symptoms** will depend more upon the cause of the displacement than upon the displacement itself, and the *treatment* must be directed to the condition which produces it.

Prolapse will be considered after studying posterior displacements with which it is usually associated.

FLEXION.

A **flexion** is an alteration in the relative position of the body to the cervix, a change in the curvature of the long axis of the uterus, *i. e.*, in the direction of its canal.

Three changes in flexion are possible, supposing, for sake of illustration, that the cervix is fixed and the corpus is bent out of its normal position. (1) The uterine axis may be anteflexed (Fig. 29), so that the normal curvature is increased; (2) the axis may become straight (miscalled anteversion (Fig. 30); (3) the axis may become retroflexed (Fig. 31), (rarely by itself, but quite common with retroversion).

A *version* is a rotation of the organ around an imaginary transverse axis, without any change in the relation which the body bears to the neck. (1) The uterus may be *anteverted*, *i. e.*, the normal forward displacement may be increased (not a very frequent condition). (2) It may be *retroverted*, either alone or with a coëxisting retroflexion; or (3) the body of the uterus may be drawn to either side of the pelvis, the cervix being directed to the opposite side, thus constituting right or left *latero-version* (the uterus normally is slightly latero-verted to the right side).

The symptoms in versions and flexions are not due to the displacement "*per se*," but to (1) interference with the functions of menstruation, conception and pregnancy;

FIG. 29.

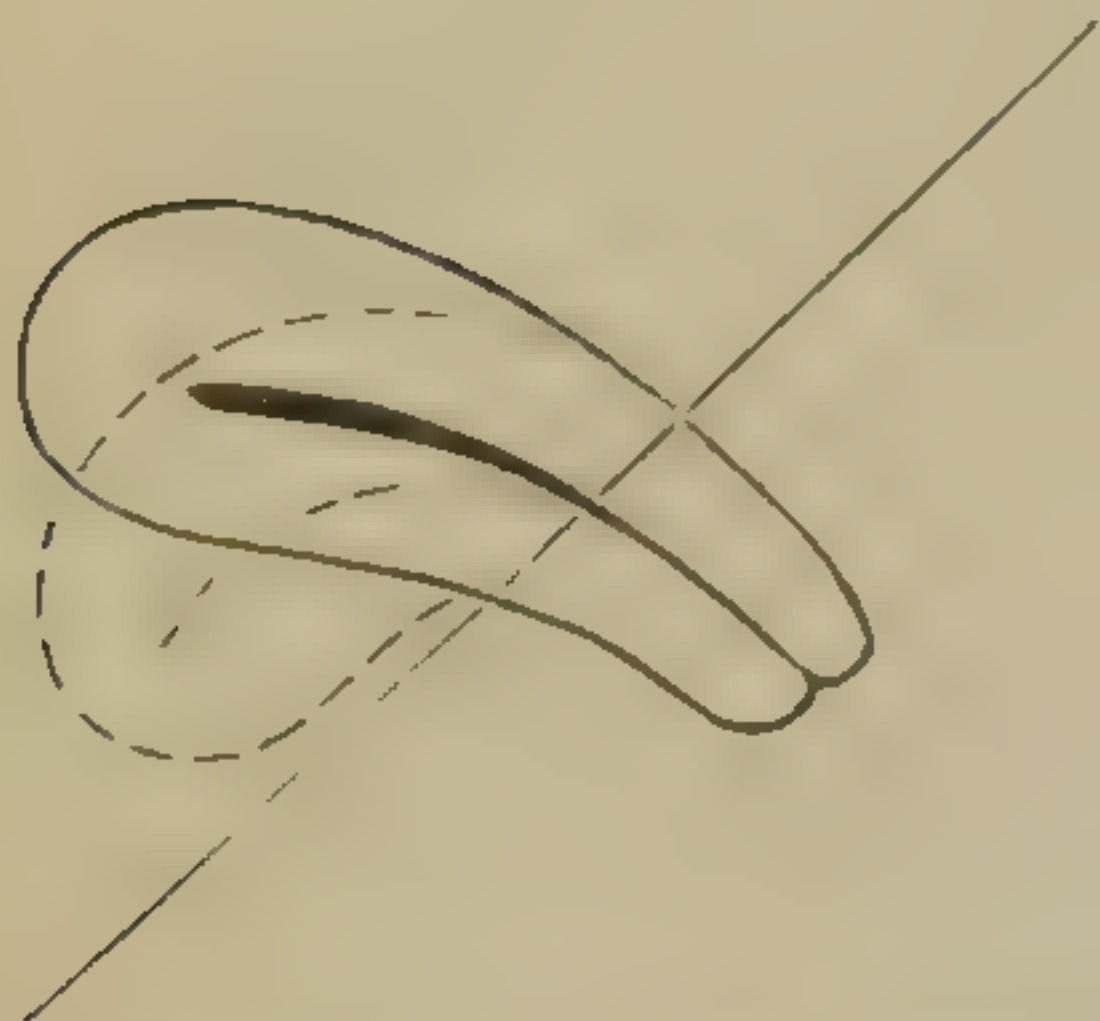
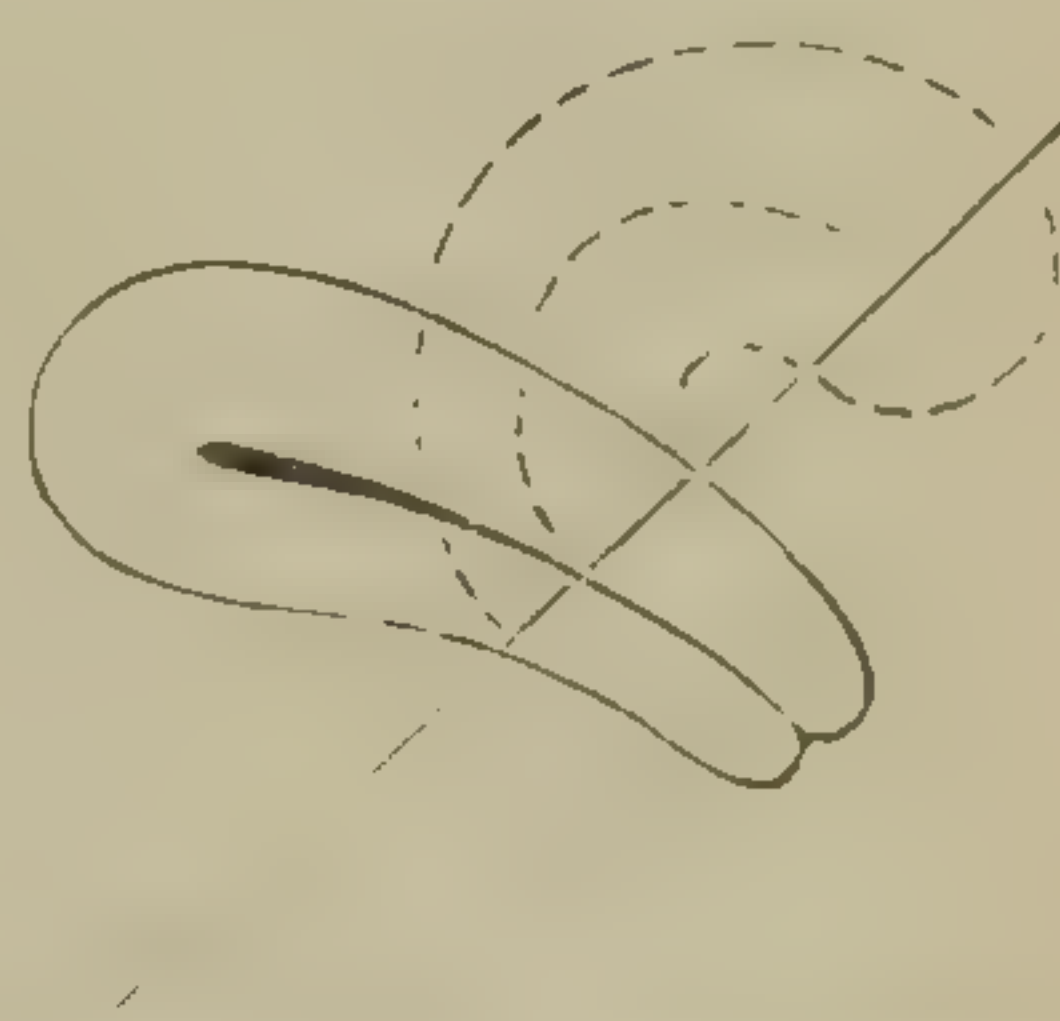


FIG. 30.

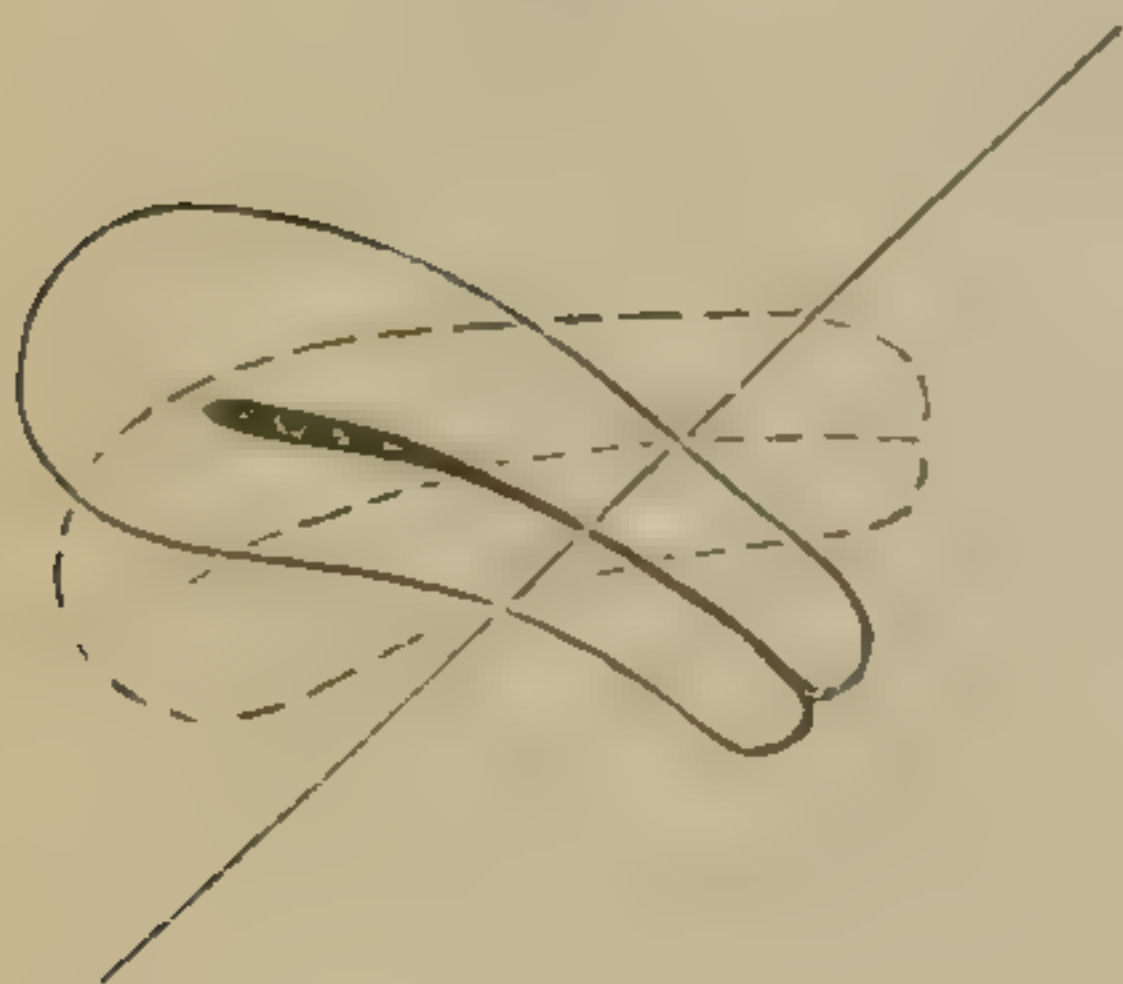


FIG. 31.



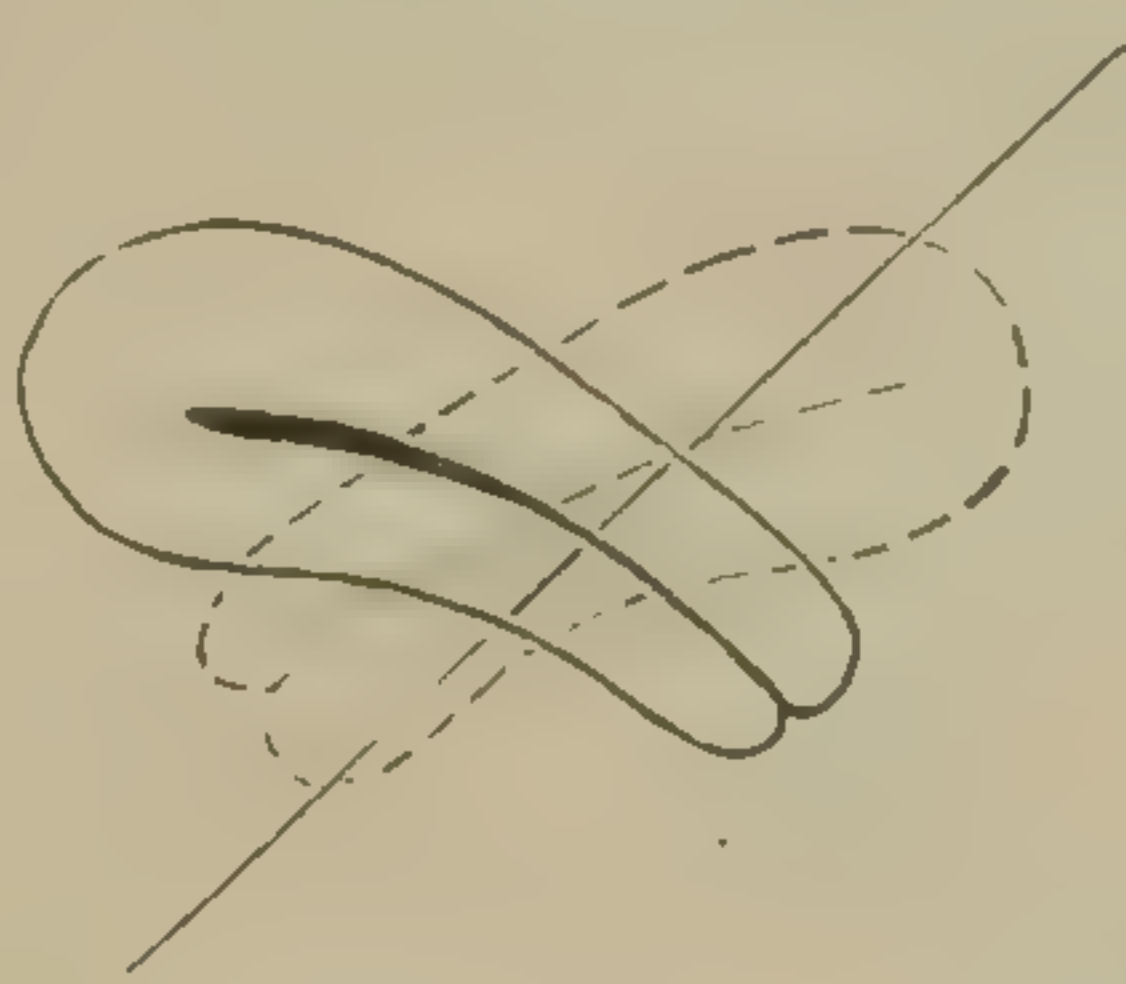
The heavy lines represent the plane of the pelvic inlet; the outline the normal position of the uterus, and the dotted lines the varieties of flexion described.

FIG. 32.



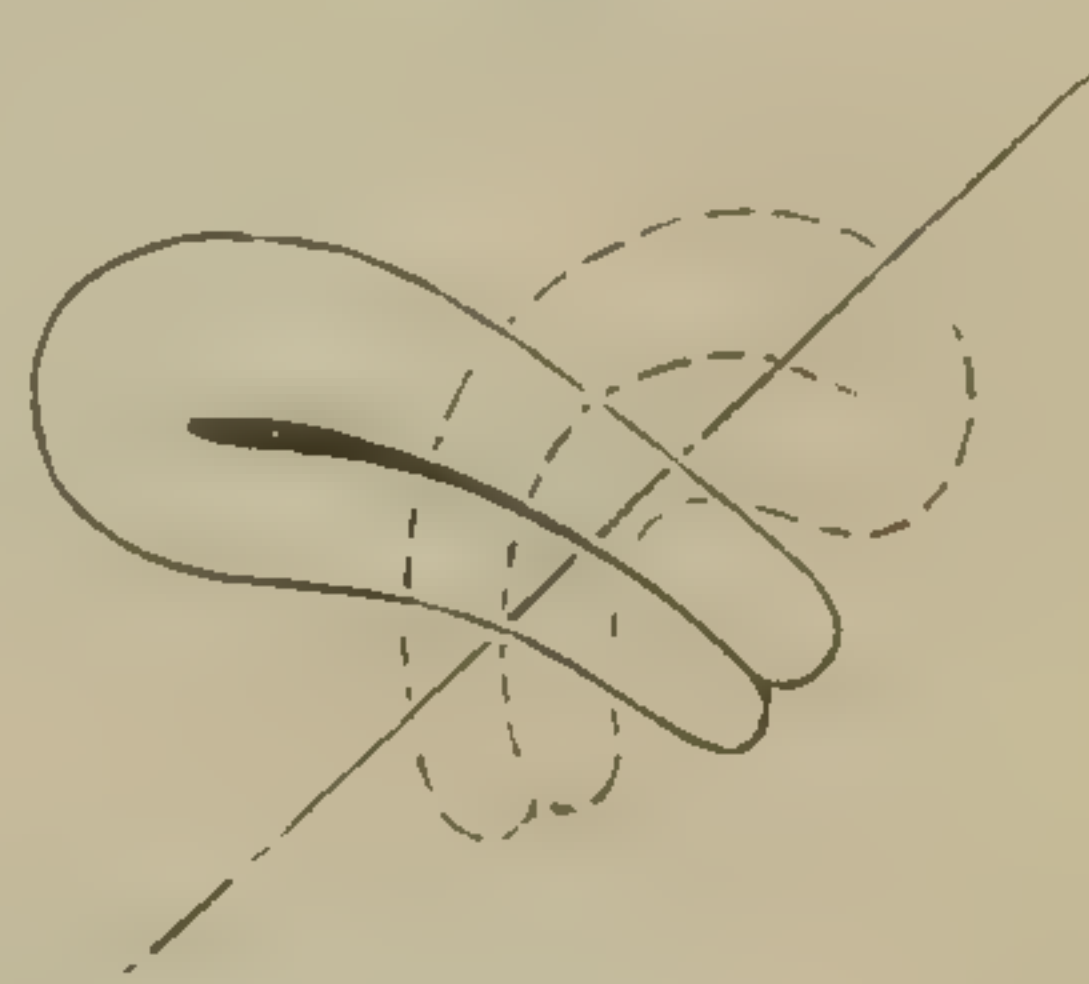
ANTEVERSION.

FIG. 33.



RETROVERSION.

FIG. 34.

RETROVERSION WITH
RETROFLEXION.

(2) To chronic metritis and endometritis caused by the displacement; or

(3) To the cellulitis or peritonitis which accompany or cause the displacement.

ANTEFLEXION.

Anteflexion is an exaggeration of the normal condition. It is more frequent in nulliparæ, because it is a frequent cause of sterility.

The seat of the flexion is usually in the upper part of the cervix, or at its junction with the body. Sometimes the neck is bent sharply forward upon itself, the body remaining in its normal position; sometimes the neck is so sharply bent that the upper part, being felt in the posterior vaginal fornix, is mistaken for the

fundus in a retroverted position, until the finger in the rectum or a bimanual examination shows its true character.

The vaginal portion is often small, the os uteri rounded and feeling like a pin-hole (in congenital cases), and it is frequently high up and hard to reach by the examining finger.

Causes.—Anteflexion may be *congenital* or *acquired*: when the latter, it may arise from

(1) *Inflammatory changes behind the cervix*; the cervix is high up and far back in the pelvis, and pain is felt when the examining finger tries to bring the cervix forward, due to cicatricial contraction in the utero-sacral ligaments (from cellulitis), drawing the cervix upward and backward and throwing the fundus forward (Schultze). This condition, when present, contra-indicates hasty operative interference, and renders the prognosis as to cure unfavorable.

According to Schröder this condition usually depends upon adhesions due to peritonitis, in which case the prognosis as to cure is equally unfavorable.

(2) *Changes in the condition of the uterine tissue* allowing flexion to take place (Graily Hewitt); or,

(3) *Fibromata or other tumors, weighing the fundus down*, may give rise to anteflexion.

Symptoms.—Sometimes the patient complains of no symptoms: generally, however, the following symptoms are more or less marked:—

(1) *Dysmenorrhœa (uterine)*.—The pain is not marked until the menstrual flow appears, but continues until it ceases. The pain is usually referred to the small of the back; sometimes to the pelvis, but is not localized in the ovarian region. In typical cases, the pain is of a bearing-down character, resembling “labor pains,” and the blood is often clotted.

Theories.—Several theories have been advanced to explain the dysmenorrhœa, of which the principal are—

(1) *The Mechanical Theory* (Simpson; Sims), which is that the flexion causes such a stricture of the canal that the uterus is obliged to go into actual labor to expel the blood from its interior.

(2) *The Congestive Theory* (Fritsch).—In the normal condition, the uterine tissues yield readily to the distending blood

vessels, but when flexion is present, there is an obstruction to the flow of blood in the vessels, the mucous membrane cannot swell as it does normally, and the undue vascular tension, together with the compression of the nerve endings, give rise to the pain.

The cellulitis and peritonitis which are often present, by increasing the pelvic congestion would necessarily cause pain of themselves.

(2) *Sterility* is another symptom frequently present, in congenital cases especially. This is said to be owing to the constriction caused by flexion, which is supposed by some to prevent, in a mechanical manner, the entrance of the spermatozoids; or to the binding down of the ovaries and oviducts by inflammatory adhesions.

(3) *Dyspareunia* is occasionally present, and is usually owing to some inflammatory action behind the cervix.

(4) *Leucorrhœa* is generally present, and may be either vaginal, or, more generally, uterine.

(5) *Menorrhagia* is also sometimes complained of.

Diagnosis.—

(1) *On Vaginal Examination*, the *cervix* is found high up, the *os* pointing downward and forward. The *fundus* is felt through the anterior vaginal vault and is continuous with the intra-vaginal portion of the cervix. An *angle* is felt where the body and cervix join. Sometimes the uterus is so high that the flexion cannot be felt, or the bend may occur at so high a point that the angle cannot be reached by the finger.

(2) *On making a Bi-manual Examination*, endeavor to include between the hands the body felt in the anterior vaginal vault, and by examining all around it, make sure that it is the body of the uterus.

Examine the posterior vault carefully, to see if any bands are present which may draw the cervix backward, and try whether drawing the cervix forcibly forward causes much pain (this will show whether there is an inflammatory condition in the utero-sacral ligaments or adhesions in Douglas's cul-de-sac). Place the index finger in front of the angle of flexion, under the fundus, and the middle finger against the cervix, and make pressure with

the external hand to ascertain to what extent the flexion will yield.

(3) *On Rectal Examination*, the finger feels the intra-vaginal portion of the cervix, and the posterior surface of the uterus as high up as the angle of flexion, and may, on recto-abdominal examination, be able to explore the posterior surface of the uterine fundus. The presence of inflammatory action may be thus also determined, as the rectal finger may find tense cord-like adhesions on either side of the uterus, resulting from former peritonitis, or a general resistance to pressure which causes pain, showing cicatricial tissue behind the cervix, due to former inflammation, instead of the pouch in the anterior rectal wall, bounded by a tense band on either side (the utero-sacral ligaments).

(4) *When the Uterine Sound*, bent in accordance with the flexion, is introduced, it passes easily until it reaches the angle of flexion, when it meets with an obstruction, which may be overcome without force if the finger pushes the fundus up, or if the cervix is drawn down with the volsellum-forceps. The sound may show that the cavity of the uterus is small (a congenitally small womb), or that the cavity is large (from obstruction to the escape of the menses), or that the cavity is tender (from endometritis). The sound must not be passed when the examination has revealed inflammation behind the uterus, nor be used except for therapeutic purposes, when a clear diagnosis has already been reached without its aid.

Differential Diagnosis.—(1) *From myomata of the anterior uterine wall.* The sound will show in its passage that the uterus is anteflexed, and a bi-manual examination carefully performed with the sound in the uterine cavity, will show its presence in the supposed tumor.

(2) *From cellulitis.* When active inflammation is present, the sound must never be passed, but here a careful bi-manual examination, if the condition is one of anteflexion, will prove that the tumor must be the uterus, as it will fail to discover the fundus in any other situation; after which the sound may be used to verify the diagnosis.

Treatment.—The best results are obtained by treating the cause of the flexion, and, if possible, not directing the treatment to the displacement itself. Endo- and parametritis must be combated

by appropriate means, the secretions of the patient kept in order, and the general health attended to. *If there is elongation of the cervix* amputation may be necessary. *In congenital cases*, where the anterior vaginal wall appears to be short, thus drawing forward the anterior lip of the cervix, the following operation will often give relief by allowing the cervix to assume its proper position. The patient is placed in the latero-abdominal position, and the cervix exposed by a Sims' speculum. The posterior lip is drawn well backward with a tenaculum, and the anterior vaginal wall divided with scissors in a transverse direction about three-fourths of an inch from the cervix, to the depth of less than half an inch. The vaginal wall is then dissected upward so that when the incised portion is put on the stretch the sides will come together, and three or four sutures are introduced (in such a manner that the transverse incision is converted into a longitudinal wound) and allowed to remain until it has united. *When the uterus is congenitally small*, it should be dilated by some of the means already discussed, or by the introduction of the sound twice a week, after which it should be stimulated by a stem-pessary (as that of Thomas), or by a weak faradaic current.

When no inflammation whatever is present, the uterine canal may be dilated, and in some instances, where this is not sufficient, it may be straightened with advantage. Neither of these operations is justifiable if there is any active inflammation, no matter how slight.

Dilatation may be accomplished by means of graduated steel sounds, in which case the canal is rarely dilated to a greater extent than would allow of the introduction of a No. 10 (English) catheter; or by tents, which have been spoken of under the head of "Gynæcological Examinations"; or by such instruments as the Ellinger, Wilson, or Goodell Dilators. Ante flexion is sometimes permanently cured by forcible, rapid dilatation with these instruments, when they are used in suitable cases. The patient should be etherized, and a careful examination having been made to determine the positive absence of any inflammation, the uterus is drawn down by tenacula, or by the volsellum forceps, and a small dilator introduced with its blades closed. The blades are then slowly separated until the uterine cavity has been thoroughly dilated,

when the instrument is closed and withdrawn, and a larger instrument inserted, which may advantageously have less curve to the blades than the first. This process may be carefully repeated several times, care being taken that the cervix is not lacerated to any great extent, and in this way not only is the uterine canal rendered more patulous, but the uterus is straightened. The patient should be kept in bed for ten days, for fear of subsequent inflammation, and the bladder and rectum prevented from becoming distended.

In other cases, after a moderate dilatation the canal may be straightened with a uterine repositor or adjuster, such as Elliott's, which consists of an instrument, looking like a uterine bougie, the point of which can be bent forward or backward at will by turning a metallic disk at the lower end. In some cases, where these means have all failed, it may be necessary to divide the posterior wall of the cervix, and even to incise the anterior wall after the method of Marion Sims. The treatment of ante flexion by pessaries is not to be recommended. Sometimes relief is afforded when the uterus is large and heavy, by supporting it by cotton tampons or, when there is much traction on the utero-sacral ligaments, by a Smith-Hodge pessary which, by drawing back the cervix and supporting the uterus, will afford relief.

ANTEVERSION.

In this condition the uterine axis is straightened so that the normal forward curve is diminished, and the cervix points more directly backward. The uterus is generally enlarged and firmer than normal, and may be movable, or fixed by adhesions.

Causes.—The causes are those which produce chronic metritis, or inflammation in the periuterine tissues.

Symptoms.—This displacement causes no symptoms of itself, any manifestations which are present being due either to the chronic uterine and pelvic inflammation, or to an enlarged uterus pressing on the bladder (frequent urination), rectum (painful defecation), or posterior vaginal wall (erosion and catarrh of the cervix).

Diagnosis.—(1) *On Vaginal Examination*, the cervix is found

pointing directly backward, the os uteri being directed toward the hollow of the sacrum. A body is felt distinctly through the anterior vaginal vault, and the normal curvature at the junction of the body and neck is absent, but there is no angle as in ante flexion. The whole uterus is larger and firmer than normal.

(2) *Rectal Examination* proves the absence of the fundus posteriorly, and the presence or absence of pelvic inflammation. The posterior surface of the fundus is difficult to reach, but may sometimes be palpated on conjoined manipulation.

(3) *Bimanual Examination* shows that the body in front of the cervix is the corpus uteri. The size and mobility should be thoroughly investigated, and if it is fixed in position the cause of such fixation should, if possible, be ascertained.

(4) *The Introduction of the Sound* is difficult, and useless except in cases of doubt as to whether the body felt in front of the cervix is really the body of the womb.

Differential Diagnosis.—*Inflammatory deposits* around the uterus may simulate anteversion, and render combined examinations difficult, but the rectal examination, by proving that the uterine body is not posterior, and by enabling the examiner at least to explore a part of its posterior surface, should aid in excluding this condition.

Treatment.—The treatment of anteversion is a treatment of the cause which produces it. The uterus may be supported by a simple soft rubber ring pessary, or by a Smith-Hodge pessary, which will act as in ante flexion.

Should there be much pressure on the bladder, Thomas's or Gehrung's anteversion pessary may afford relief.

RETROVERSION.

Retroversion is found during the early stages of pregnancy; during the progressive stages of prolapse; as a stage of retro flexion; and from cicatricial adhesions behind the uterus drawing it backward.

Causes.—A sudden straining effort, or a violent blow, when the bladder is full especially, or when the uterus is enlarged and heavy from any cause, may produce retroversion. It may also be due to

the too prolonged use of a very tight bandage after childbirth, particularly when there is a failure of normal involution. Inflammatory action behind the uterus giving rise to adhesions or cicatricial bands, may cause or perpetuate the difficulty.

Symptoms.—The symptoms are due to disorder of the uterine circulation, or to pressure of the uterus on the adjacent organs or on the anterior wall of the vagina; thus the first cause may produce menorrhagia or, if the displacement occur soon after parturition, a late flooding, coming on two or three weeks after labor, or a daily loss of small quantities of blood whenever the patient rises or moves about much (Fritsch).

From the second cause constipation (ribbon-like stools) and tenesmus may occur if the uterus presses on the rectum; otherwise there will be no symptom from the bowel; irritability of the bladder and vesical tenesmus, if the cervix presses on the urethra or neck of the bladder, and uterine catarrh and erosion of the cervix from pressure on the anterior vaginal wall. In addition there may be various reflex disturbances, as neuralgia or gastric disturbance.

Diagnosis.—(1) ON VAGINAL EXAMINATION, the cervix is low down, the os looking downward and forward. The supra-vaginal portion, and perhaps the body, is felt through the posterior vaginal vault. The posterior surface is straight, there is no angle of flexion at the junction of the neck and body.

(2) RECTAL EXAMINATION shows that the body felt in the posterior vault moves when the cervix is drawn down by tenacula, and it may even be possible, if there are no adhesions, so to draw it down as to enable the finger in the rectum to palpate the posterior uterine surface, and even the fundus, and thus settle the diagnosis positively.

(3) ON MAKING A BIMANUAL EXAMINATION, the hands almost meet in the anterior vaginal vault, being separated only by the abdominal wall and the vaginal tissues,—no fundus being felt between them. Endeavor to lift up the fundus (difficult);—try to lift it up by one finger under it and one in front of the cervix (push and pull); the external hand will feel the anterior surface of the body moving under it during this manipulation.

(4) THE SOUND passes for a little more than an inch easily enough; then reverse the handle, carrying it forward toward the

pubis, and the point can readily be passed backward, into the uterine body.

Treatment.—The treatment of this, as of the other displacements which have been previously studied, depends largely on the cause, and on the condition of the uterus and adjacent parts.

If uterine catarrh is present, it should be treated by hot-water injections, glycerin tampons, dilatation of the canal and the application of a solution of iodine to the endometrium. *When the catarrh has been cured*, if no adhesions are present, *the uterus should be replaced* either by abdomino-vaginal or abdomino-rectal manipulations, aided perhaps by the genu-pectoral position. The investigations of Hart and Barbour on the cadaver, have proved conclusively that this position, without manual interference, far from reducing the displacement, rather tends to increase it; as the vagina becomes elongated, the cervix recedes from the examining finger, and the fundus uteri is consequently thrown further back than it was before. The replacement may in some cases be materially aided by hooking a tenaculum in the posterior lip of the cervix and drawing it downward while at the same time the finger in the posterior vaginal cul-de-sac or in the rectum pushes the uterine body upward. The replacement may also be accomplished by the uterine sound, but this is a dangerous measure, as the endometrium of the fundus acts as a fulcrum for the end of the sound during the manipulation necessary for the replacement, and there is liability of perforating the uterus, especially if it be pathologically softened. In some cases, where the uterine tissue is very rigid, it may be replaced by the introduction of a Hodge, or of a Smith-Hodge pessary.

When the uterus has been replaced, it should be maintained in the proper position by one of the above pessaries, or by a cotton packing.

Should adhesions prevent any of these manipulations, or render the uterus immovable, they should be removed by the ordinary treatment for adhesions and cicatricial tissue, *i. e.* : Hot water injections, tampons soaked in a solution of potassium iodide (1 part) in glycerin (5 parts), or by the use of the galvanic current.

Should the displacement be due to a tumor, it must be removed if practicable, or pressed up out of the pelvic cavity, and kept there by a suitable pessary.

RETROFLEXION.

This condition is generally associated with retroversion, and is very common.

Pathology.—The cervix points downward and forward, or directly downward, and the os is patulous, because retroversion usually implies previous parturition. Sometimes the posterior lip is much hypertrophied.

The uterus is flexed on itself, so that the fundus lies in Douglas's cul-de-sac. The size of the uterus and of its cavity is increased; the thickness of the uterine walls at the angle of flexion varies,—either the anterior or the posterior wall may be atrophied. A chronic catarrh of the endometrium is usually present.

The microscope shows a dilated condition of the vessels, and an increase of the connective tissue: at the point of flexion, the blood-vessels are said to be compressed and their walls thinned.

The ovaries usually follow the fundus uteri, but may be fixed anywhere by peritoneal adhesions. They are often enlarged and tender.

The bladder is not necessarily altered in position. The ureters are often compressed and bent, leading to their subsequent dilatation.

The rectum is diminished in calibre, by pressure of the retroflexed fundus. *The peritoneum* is altered in its relations as follows:—the surfaces of the broad ligament are reversed,—the utero-vesical pouch obliterated,—Douglas's cul-de-sac distended by the fundus, and the utero-sacral ligaments stretched by the altered position of the cervix.

Causes.—This condition is seldom congenital, and is rare in nulliparæ. The causes are often very obscure. It is frequent in multiparæ and may be produced in the following manner:—During the puerperal period the uterus is enlarged and heavy and its walls are soft; the ligaments are lax; the pelvic floor has been stretched, and has not regained its tone; the bladder by its distention often throws the uterus into a retroverted position, and intra-abdominal pressure acting on the anterior surface of the uterus will increase and perpetuate this position; straining will gradually cause the uterus to undergo retroflexion if the uterine tissues are

soft enough to flex. This condition will also be favored by the dorsal position, and by wearing the abdominal bandage applied too tightly. Getting up too soon also favors retroflexion.

Symptoms.—(A) *Those which are more or less continuous.*

Weakness in the back.—This is a very common symptom. Sometimes it amounts to actual pain. It is increased on exertion and at the menstrual period.

Symptoms of chronic pelvic peritonitis are also common; such as a feeling of weight and discomfort in the pelvis, which may sometimes be accounted for by the stretching of old adhesions.

Painful defecation and tenesmus, due to the pressure on the rectum by the fundus.

(B) *Periodical Symptoms.*

Leucorrhœa from chronic inflammation of the mucous membrane is almost invariably present. As a result of the flexion there is a passive congestion of the uterine tissues with a hypersecretion, at first only immediately after the menstrual period, but gradually, as the congestion runs into chronic inflammation, the discharge is found continuing during the whole intermenstrual period.

Dysmenorrhœa is sometimes found, but is not so common as in ante flexion.

Menorrhagia is one of the prominent symptoms. It is in part due to the endometritis, and in part to the obstruction to the return of venous blood.

(C) *Symptoms referable to the reproductive function.*

Sterility is frequent, and may be due to the altered position of the cervix; to the increased secretion of mucus; to the obstruction of the oviducts or to the malposition of the ovaries and the adhesions with which they are bound down.

Abortion, is also frequent and may be caused by the inability on the part of the uterus to resume its normal position, or by the pathological condition of the mucous membrane which prevents the firm attachment of the ovum.

Diagnosis.—*On making a vaginal examination*, the cervix is found low down, and the os looks directly downward. The uterine body which is felt, firm and round, through the posterior vaginal vault, is continuous with the cervix, but separated from it

by a groove, more or less distinct, according to the degree of flexion. When the forefinger is placed on the cervix, and the middle finger on the body felt through the posterior vault, any movement imparted to the former will be communicated to the latter.

On making a bimanual examination the finger in front of the cervix almost meets the fingers of the external hand—there is no uterine fundus between them. Press one finger against the body, or better, place one finger on the cervix and one on the body, and lift up the cervix; pressing the other hand well down the cervix may be felt through the abdominal wall with the upper surface of the uterus curving backward from it. Press the fundus upward steadily, and see whether it is movable, whether the flexion is overcome, or whether it gives rise to pain.

On rectal examination the finger passes over the uterine fundus; if it is difficult to reach it, draw down the cervix with the volsellum-forceps. Rectal examination is invaluable when, from rigidity of the abdominal walls, it is impossible to make a satisfactory vagino-abdominal examination.

When the sound is properly curved to suit the flexion, it passes in readily with the concavity of the curve directed backward. It shows the size of the uterus, shows whether or not the uterus can be replaced, although for this purpose bimanual manipulations are safer and better, and is very useful in differential diagnosis.

Differential Diagnosis.—*From fæcal matter in the rectum.* There is no difficulty, if a careful examination is made, but a positive opinion regarding the condition of the pelvic organs should never be given when the rectum is loaded with fæces.

From pelvic deposits in Douglas's cul-de-sac (*peritonitis, hæmatocele, carcinoma*). In these cases the uterine body and fundus are found elsewhere by a careful bimanual examination, or by the sound. *If inflammation is present*, and the sound contra-indicated, bimanual examination may be difficult, and if a rectal examination does not settle the diagnosis, it may have to be deferred.

From a cellulitic deposit behind the cervix. This condition is rarely mistaken for retroflexion. Enough has been said to indicate the method of arriving at a diagnosis.

From retro-uterine fibroid. The uterine body and fundus in these cases will be found elsewhere by bimanual examination and the sound, or by both combined. If inflammation is present, the diagnosis may be very difficult.

From a prolapsed and enlarged ovary or from a small ovarian tumor. Here bimanual examination and the sound, and drawing down the cervix with the volsellum-forceps, will discover the uterine body situated elsewhere, and will show the relation which it bears to the tumor. *Ovarian tumors* are softer and more elastic than the uterus.

Treatment.—Complications are to be removed by the means spoken of when treating retroversion, and the uterus should be dilated as an antelexion and the flexion corrected by a repositor or adjuster. *When the flexion is overcome*, a suitable pessary, such as is used in retroversion, should be employed to keep it in place. These cases will often prove tedious, but perseverance will usually give relief, if it does not entirely cure the patient.

PROLAPSE OF THE UTERUS.

It is usual to divide uterine prolapse into three stages. *In the first stage* the uterus descends until the cervix rests upon the pelvic floor; *in the second* the descent has continued until the cervix appears at the orifice of the vagina; while *in the third stage* the uterus is partly or entirely outside the body. As the uterus descends in the axis of the pelvis, the direction of its axis must change to correspond to that of the canal through which it is passing, so that the entire organ becomes retroverted as it descends, until in the third stage its axis is almost at right angles to that of its original position.

Cause.—A disproportion between the weight of the uterus and the strength of its supports: thus an enlarged and heavy uterus, due to an arrest of involution after childbirth, or an atrophy of the vagina and uterine ligaments, as sometimes occurs in old women who are badly nourished, may allow prolapse to occur. If the perinæum is ruptured, the support below being destroyed, prolapse is apt to follow.

If the vagina remains hypertrophied—does not undergo the

normal involution after labor—it may itself prolapse and draw down the bladder, rectum and uterus with it. Heavy lifting also aids in the production of this trouble.

Symptoms.—As the uterus descends it drags down the bladder and the rectum, causing a constant desire to evacuate these organs, with tenesmus. These symptoms are greatly relieved by the recumbent position, as is also the sense of weight in the pelvis and the pain in the back. The deranged circulation consequent upon the altered position of the viscera, leads to mal-nutrition, to chronic congestion and hyperplasia of the parts, and if the prolapse is complete, the friction and irritation caused by the protrusion of the uterus outside of the woman's body leads to excoriation and even to ulceration.

Diagnosis.—*Inspection* shows a large mass protruding from the vulva, if the prolapse be complete, in the centre of which is the os uteri. The cervix is seen to be enlarged and the endometrium everted. The os may be eroded or ulcerated. The bladder and rectum also protrude.

Vaginal Examination will show the uterus lower down than normal, and the vagina apparently shortened. The uterus is easy to replace.

Rectal Examination shows the absence of the uterus above (especially when *recto-abdominal examination* is made), and the finger can readily palpate the displaced fundus.

The sound passes readily into the os, and shows that the uterine cavity is not materially elongated (thus differentiating prolapse from hypertrophy of the cervix).

Treatment.—The uterus must be replaced and kept in position by a suitable pessary, or by packing the vagina with antiseptic cotton, and any complications which are present should be removed by the usual treatment. The enlargement and ulceration of the uterus, which is so often seen in complete procidentia, will usually disappear rapidly when the uterus has been kept in its proper position for a week or ten days. Astringent tampons, with rest in a horizontal position, will often permanently relieve slight cases of prolapse, when not of too long standing, and when associated with or due to relaxation of the vaginal tissues. In prolapse occurring in old women, where an operation is contraindicated, it is best to

teach her or one of her friends how to pack the vagina, so as to retain the uterus in its proper position.

Various operative procedures have been recommended to relieve prolapsus uteri, the principal of which is to restore the perinæum (which is sometimes sufficient of itself to effect a cure), and to lessen the calibre of the vagina.

For the latter purpose, anterior or posterior colporrhaphy or a combination of both have been performed.

Alexander's operation (consisting in replacing the uterus with a sound, and cutting down upon and suturing the round ligaments, having drawn them tense, to the pillar of the external ring), has been performed, sometimes with success, sometimes with danger, and frequently with entire failure.

INVERSION OF THE UTERUS.

In inversion the uterus is turned inside out, so as to form a polypoidal projection into the vagina; its peritoneal surface being converted into a cup-shaped hollow, and its mucous membrane everted, and lying exposed on all sides, in the vagina.

Mechanism.—(1) A portion of the muscular wall having lost its tone, becomes depressed toward the uterine cavity. In puerperal conditions this is generally the placental seat. In cases of tumor the uterine wall is weakened either by fatty degeneration (Scanzoni), or by malignant infiltration (A. R. Simpson). (2) The depressed portion is carried further into the uterine cavity (until it reaches the os internum) by muscular contraction of the non-depressed portion aided by intra-abdominal pressure, or traction from below, as on the placenta or pedicle of the tumor. (3) The inverted fundus dilates the cervical canal, by the continuation of the same process, and is born into the vagina.

Varieties.—(1) *Slight Inversion* of the uterine wall, as at the base of a fibroid polyp, is sometimes seen. (2) *Partial Inversion*, where the fundus has descended to the os internum, is found as a chronic condition. (3) *Complete Inversion* is most frequent.

Relations of Parts in Complete Inversion.—(1) *The Body of the Uterus.* In simple uncomplicated cases inversion extends as far as the os internum, but no further. The uterus is partly in

the vagina and partly in the cervical canal, its neck being constricted loosely (favoring hemorrhage) or tightly (favoring gangrene) by os externum. After involution it becomes small, round and firm, and may simulate a fibroid polypus, but is rounder, deeper red, and has a smooth, slippery surface, bleeding easily on being handled. The mucous membrane is usually congested. It may be ulcerated, or gangrenous. Its cubical epithelium may be replaced by pavement cells.

(2) *The cervix uteri* is rarely displaced, and usually forms a broad rim around the neck of the tumor. Sometimes the vagina becomes inverted, when the cervix will be more or less inverted also.

(3) *Oviducts and Ovaries.* These, with some coils of the small intestines, at first lie in the inverted cup, but afterward they become retracted in long standing cases, and from muscular contraction the rim of the cup becomes so small that the finger cannot be passed into it.

(4) *The peritoneum.* Peritoneal adhesions rarely form.

(5) *The Bladder* retains its normal position, unless complete prolapse occurs, when cystocele may be present.

Types of Inversion.—In simple inversion the cervix and bladder retain their normal positions. In complicated inversion there is prolapse, the cervix is likewise inverted, and cystocele is present.

Causes.—(1) *Puerperal Inversion* is much more rarely seen than formerly, especially since the placenta has been removed by compression (Credé's method).

(2) Inversion may follow intra-uterine tumors growing from the fundus.

Symptoms.—(1) *At the time of occurrence* there is a feeling of something giving way in the pelvis, pain, hemorrhage, and sometimes collapse.

(2) *After the inversion has become chronic* hemorrhages will take place, which are profuse at menstruation, but also occurs during the inter-menstrual period. The bearing down pain in the pelvis varies in degree. There is also anæmia and weakness from loss of blood.

Diagnosis.—(1) *Of recent inversion at childbirth.* The hand

on the abdomen finds a cup-shape depression, instead of a rounded fundus. The cervix is drawn up so high as to lie above the pubis. If the placenta is not detached great care is required to distinguish it, and not increase the inversion. If the placenta is removed a large, soft body fills the vagina.

(2) *Of chronic inversion.* (a) *On Vaginal Examination*, a round, firm, or flattened and soft tumor, which bleeds easily, occupies the vagina, and hangs free on all sides except above. Around the upper extremity the cervix is felt, the lips and vaginal walls being distinctly recognized, or the cervix is thinned out in a ring, and the fornices are obliterated. If the cervical canal be obliterated by adhesions, the finger will not pass further up. If it be patulous the finger may be passed up from one and a half to two inches, and will feel that the cervical mucous membrane is reflected equally all around on the neck of the tumor.

(b) *Bimanual Examination.* Lift up the tumor by two fingers in the vagina, one placed in front and one behind it, and with the other hand on the abdomen feel in the place of the fundus uteri a truncated body with a central depression.

(c) *Rectal Examination.* The finger in the rectum feels a body in the vagina. If this body be drawn down with a noose of broad tape the finger feels the upper border of the tumor ending abruptly. No fundus will be felt between it and the tumor in the rectum.

(d) *The Sound* may be used to probe around the neck, where there is no room for the fingers.

Differential Diagnosis.—(1) *From Uterine Polypus lying in the vagina.* In this case the fundus is found elsewhere, and the sound passes along the side of the polypus for two and a half inches plus, and may feel its attachment.

(2) *From Intra-uterine Polypus.* A careful rectal examination, under chloroform or ether, will differentiate this condition, and the sound shows the uterine cavity always enlarged in polypus.

(3) *From Intra-uterine Polypus with partial inversion.* A careful rectal and bimanual examination may show a depression on the upper uterine surface; or, if an effort be made to remove it, there may be great pain on tightening the wire of the *écraseur*, which may lead to the suspicion that a portion of the uterine wall has been included in the noose.

(4) *From Prolapsus Uteri.* The presence of the os uteri, through which the sound can be introduced into the uterine canal, and a rectal examination, should make the diagnosis clear.

Results.—*Spontaneous re-inversion* sometimes occurs, but is exceedingly rare. Occasionally *the inversion may exist without injurious results*, the system becoming tolerant to it. In the majority of cases, when unrelieved, *death* occurs either from anæmia, from hemorrhage, from septicæmia or from peritonitis.

Treatment.—In cases of *recent inversion* try to reduce as speedily as possible, the sooner the better. Withdraw the pillows from the patient's head, elevate the foot of the bed, and take other precautions, as in hemorrhage after labor. Grasp the inverted uterus with the hand to lessen its size, and by compression to check the hemorrhage. Having removed the placenta, if not previously detached, endeavor with the thumbs to dilate the cervix, at the same time compressing the tumor and pressing it upward, so that that part which came out last shall go in first. If this does not succeed endeavor to reduce it by pressure on one of the uterine cornua. If the patient does not die from hemorrhage within an hour, she will probably not die from this cause. Make repeated attempts within the first twenty-four hours, and if not successful it is better to wait until after sub-involution. These methods may be aided by the latero-abdominal or genu-pectoral position.

In cases of *chronic inversion*, the vagina usually has to be dilated so that the hand may be introduced. When this has been accomplished by means of the hand or of the inflated rubber bag, the same measures which are employed in recent inversion may be resorted to at the same time that the hand on the abdomen depresses the walls and endeavors to dilate the upper ring of the inversion.

Repositors (as White's egg-beater repositor) may be used either to aid the reduction, or in case the effort is to be temporarily abandoned, to prevent recurrence of the inversion, if it be partially reduced. In case all efforts fail hysterectomy may be performed.

DEVIATIONS FROM NORMAL UTERINE FUNCTIONS.

AMENORRHŒA.

Definition.—Absent or scanty menstruation.

Causes.—(1) *When the menses are absent at puberty* it may be due to atresia of the uterus, vagina or vulva. In these cases the girl is developed, but no flow appears, and if this continue for several months, especially if symptoms of menstruation are present and the uterus is enlarging, digital examination should be made to reveal the seat of the atresia. Bad hygienic conditions may retard puberty, and thus delay the appearance of the menstrual flow. Intense mental strain, as in the case of a school girl, may also be a causative agent.

(2) *When the menses have been once established* they may become scanty or cease entirely, where there is general deterioration of the health, as in cases of tuberculosis, or convalescence following low fevers.

(3) *The menses may be scanty* from insufficient development of the uterus (an infantile condition), or from determination of blood to other parts, or from anæmia and constipation.

(4) *The menses may be acutely suppressed* from mental shock, or may be purposely arrested, or may cease suddenly from taking cold.

Symptoms.—Sometimes no inconvenience is experienced from amenorrhœa. Generally, particularly in acute suppression, there may be headache, fever, pain in the chest and pelvis, and frequently hemorrhage from some other organ.

Treatment.—The treatment depends upon the cause. If there is atresia, operative interference is called for. If it be due to bad hygienic conditions, good diet, exercise in the open air, and emmenagogues may be resorted to. In case of over-study the girl should be taken from school, should have plenty of exercise, fresh air, good hygiene and good food. Where the health is deteriorated, tonics should be given, and the cause should be treated. If the uterus is not properly developed it should be stimulated by faradism or by a galvanic stem pessary. Potassium permanganate or apiol are also of service. Where anæmia with constipation is present, iron and aloes are indicated. If the menses be acutely

suppressed, local depletion by leeches or scarification of the cervix, mustard foot-baths, and mustard plasters to the thighs and hypogastrium are the best means to resort to. Should the menstrual period be overdue the flow will rarely appear, except in the case of acute suppression, before the next period.

XENOMENIA.

Synonym.—Vicarious menstruation.

Definition.—A periodical flow of blood from any organ other than the uterus, the menses usually being scanty or absent.

Treatment.—Endeavor to re-establish the menses, but not to check the hemorrhage from the other organ. This hemorrhage will cease when the normal flow returns. Mustard foot-baths, mustard plasters to the thighs and hypogastrium, stimulating vaginal injections, cathartics, especially such as determine the flow of blood to the pelvic organs (aloes), faradism, and galvanic stem pessaries, are the best means of correcting this condition.

DYSMENORRHŒA.

Definition.—Menstruation accompanied by more than the usual amount of pain.

Varieties and Causes.—(1) *Mechanical Dysmenorrhœa*; due to some cause which mechanically obstructs the outflow of blood, as stenosis of the os uteri, or sharp flexions.

(2) *Congestive Dysmenorrhœa* occurs where there is excessive congestion of the uterus and ovaries from any cause.

(3) *Neuralgic Dysmenorrhœa* is seen in nervous or hysterical women, and is frequently accompanied by neuralgiæ referable to other situations.

(4) *Membranous Dysmenorrhœa* is sometimes associated with endometritis.

Symptoms.—Pain occurs, preceding, during or following the menstrual flow. *In mechanical dysmenorrhœa* the pain occurs simultaneously with the appearance of the flow, and consists of a series of uterine cramps due to the effort of the uterus to expel blood clots from its interior. *In congestive dysmenorrhœa* the pain precedes the flow, and is relieved when the latter becomes free. *In neuralgic dysmenorrhœa* the pain is referred to the

hypogastrium, left ovarian and intercostal regions. It often occurs in the inter-menstrual period, but is always aggravated at the time of the sickness. *In membranous dysmenorrhœa* the pain lasts throughout the period, and until the expulsion from the uterus of the more or less complete membranous cast. This may be diagnosed from an abortion by the absence of the shaggy outgrowths of the chorionic villi.

Treatment.—*In mechanical dysmenorrhœa* dilate the stenosis, correct the flexion, and prevent its recurrence. *In congestive dysmenorrhœa* improve the circulation by massage, hot foot-baths, vaginal injections and ergot with bromide of potassium. Avoid constipation, and apply iodine to the endometrium. *In neuralgic dysmenorrhœa* pay great attention to the state of the bowels; let the patient exercise in the open air, and give iron, quinine, and other tonics internally. *In the membranous variety*, dilatation of the cervix just before the menstrual period, with the correction of any local or general disorder, will sometimes succeed in breaking up the attacks. *In any variety* where the pain requires it, potassium bromide and chloral may be given, with mustard plasters applied to the painful parts. If the pain does not yield to this treatment, opium and belladonna suppositories may be resorted to, but these should never be given when their use can be avoided, as the danger of a formation of the opium habit is very great in these cases.

MENORRHAGIA, METRORRHAGIA.

Definition.—*Menorrhagia* is an increased flow of blood and mucus, occurring at the menstrual period. *Metrorrhagia* is a flow of blood from the genitalia in the inter-menstrual period.

Causes.—(1) *Constitutional causes.* Hemorrhagic diathesis, scurvy, fevers, tuberculosis, super-lactation, etc.

(2) *Local causes*, as tumors of the uterus, chronic inversion, lacerated cervix, chronic peritonitis, pelvic hæmatocele and chronic ovaritis.

Treatment.—Discover the cause, and treat it. If there is a want of uterine contractile power, ergot, hydrastis or cotton root bark, combined with rest in bed, and copious hot-water vaginal injections will usually prove efficacious. If these do not succeed,

tampon the upper portion of the vagina, or apply astringents to the endometrium, as tincture of iodine, with glycerin or Monsel's solution diluted.

ALTERATIONS IN UTERINE STRUCTURE.

ACUTE ENDOMETRITIS.

Causes.—This disease occurs in young girls after acute fevers, or it may be due to taking cold during menstruation, or to an extension of inflammation from other parts, to chronic catarrh or laceration of the cervix, with inversion of the cervical mucous membrane. It is quite a rare disease.

Symptoms.—*Leucorrhœa*. The discharge is thick, tenacious and often profuse, sometimes resembling the white of an egg. *Menorrhagia* may be present. A sense of fulness or pain in the pelvis, and pains in the loins, is sometimes complained of. The acute stage soon subsides, and is followed by chronic endometritis.

Treatment.—The treatment should be directed to the cause. If from syphilis, constitutional treatment will answer best. If from suppression of the menses, or when very acute from any cause, warm mucilaginous injections, salines and rest will give the best results.

CHRONIC ENDOMETRITIS.

This is a frequent disease. It may be divided into *corporeal* and *cervical*, according as the inflammation is limited, to the uterine body or neck.

Causes.—It may follow the acute disease, or start as a chronic affection from specific or other constitutional cause. It may be due to lacerated cervix, violence during coitus, ill-fitting pessaries, etc.

Symptoms.—Leucorrhœa more or less profuse, is the principal symptom.

Treatment.—Try to find the cause, and remove it. *If from lacerated cervix*, reduce the size of the uterus by leeches, scarification, iodine, hot-water injections, glycerin tampons and the application of iodoform ointment. *If the leucorrhœa still persists*, operate for laceration of the cervix. *If there is eversion of the*

cervical membrane scarify the mucous membrane, evacuate the contents of the cysts, and use the remedies already mentioned.

If there is chronic catarrh of the cervix, but no eversion, relieve the congestion by local measures, and use astringent applications to the cervical mucous membrane of the intravaginal portion.

If the body of the uterus is involved the patient is usually sterile. In these cases dilate the uterus with tents or little pledgets of iodized or borated cotton, left in for twenty-four hours and replaced by others until the canal is sufficiently patulous. After dilatation wash the cavity with carbolic acid water (40 per cent.) and apply to the endometrium by means of cotton, on an applicator, solutions of corrosive sublimate, zinc sulphate, or Monsel's solution and glycerin, repeating the application every three or four days. Correct any displacement which may exist, build up the patient's general health, and insist upon absence from sexual intercourse, and on rest during the menstrual period.

ACUTE PARENCHYMATOUS METRITIS.

This disease is not frequently met with. It is caused by excesses in coitus, especially if the uterus is displaced; by the use of ill-fitting pessaries, by miscarriage, etc.

Symptoms.—It begins with chill, fever, quick pulse, leucorrhœa and pain in the hypogastrium radiating down the limbs. It occasionally terminates in abscess.

Treatment.—Rest in bed is absolutely necessary. Opiates should be given to relieve the pain. Hot vaginal injections may be used, with ice bags or counter-irritation by mustard plasters.

CHRONIC PARENCHYMATOUS METRITIS.

Synonyms.—Chronic Metritis. Diffuse proliferation of connective tissue (Klob). Areolar hyperplasia (Thomas). Subinvolution.

Pathology.—*In the early stages* the organ is enlarged, soft and hyperæmic. In the first period of development the dominant lesion is the presence in great number of embryonic elements throughout the whole thickness of the muscular wall. These elements are met with especially around the blood-vessels, or in the form of islands of variable dimensions which are more or less separated

(de Sinèty). *Later* the uterus is indurated, hard, anæmic, and white in color from compression of capillaries by cicatricial tissue. The uterine walls are increased in thickness; the uterine cavity is increased in size. Marked dilatation of lymph spaces takes place, and localized hyperplasia of the connective tissue around the blood-vessels. It differs from sclerosis in the fact that the formations of connective tissue are localized around the blood-vessels.

Causes.—(1) *Causes interfering with normal involution.* Involution consists essentially of fatty degeneration of the muscular fibres of the puerperal uterus and the removal of the products of this degeneration. In chronic metritis (sub-involution) the muscular fibres degenerate, but their place is taken by hyperplastic connective-tissue. This condition may be brought about by—

Retention of foreign substances (as pieces of membrane, placenta, or blood-clot) acting as sources of irritation; *laceration of the cervix* (acting in the same way).

Pelvic inflammations after labor (through interference of the circulation).

Rising too soon after delivery (the weight of the heavy uterus leading to passive congestion, and thus to the formation of connective tissue).

Non-lactation. (Nursing causes reflex contraction of the uterus, and hence diminishes the tendency to passive congestion; when not performed, this stimulus is absent).

Repeated miscarriages (a very important cause. Women are not apt to take sufficient care of themselves after abortion, and of course do not nurse their children).

(2) *Causes producing repeated or protracted congestion.*

Uterine displacements; pressure on the uterus (from distended bladder, distended rectum, or tumors in or near the uterus); or *any condition producing an increased flow of blood to the uterus* (as endometritis, too free use of caustics, or excessive sexual activity) tends to develop this disease.

Symptoms.—These most frequently date from a confinement, or from recurring abortions. They are weakness in the back, sometimes amounting to absolute pain; usually a sense of weight and bearing down in the pelvis, and a want of power in the limbs; leucorrhœa and menstrual irregularities, the flow being often

increased at first in frequency and quantity, afterward diminished and finally absent.

Abortion may occur before the structure of the uterus becomes permanently altered, because until then pregnancy is possible.

Sterility is very common, due not only to the leucorrhœa, but also to ovaritis or to the pelvic peritonitis which is usually super-added.

General constitutional derangements are seen, such as are commonly found in all chronic uterine troubles.

Diagnosis.—(1) *Vaginal examination.* The uterus is equally enlarged in all directions, and not altered in form.

The cervix, if it be affected, is enlarged, swollen, tender, hard; is lower in the vagina than usual, and the os is patulous.

Retroflexion is common. The uterus may, however, be anteverted or retroverted.

(2) *Bimanual examination.* This shows the uterine body to be enlarged, thickened, and with firm walls; either in its normal or in its verted or flexed position, and freely movable, or fixed by adhesions.

(3) *The sound* passes readily for more than two and a half inches and is felt to move freely in the large uterine cavity.

Differential Diagnosis.—(1) *From early pregnancy.* In these cases the rational signs; the purplish discoloration of the vagina; the change in shape of the uterus; the rounded fundus, less distinct in outline; and the softened cervix, should make the diagnosis easy.

(2) *From small fibroid tumors.* In these cases the uterus is more globular than flat, and the enlargement is unequal and nodular.

(3) *From carcinoma of the cervix.* The leucorrhœa differs in character and is not foul smelling; there is no cachexia; digital examination is not followed by profuse hemorrhages, nor does the tissue break down readily under the examining finger.

Treatment.—(1) Look for and remove the following conditions, which tend to keep up the chronic congestion. Laceration of the cervix; fungous degeneration of endometrium; granular or cystic degeneration of cervix; uterine displacements, and vaginitis.

(2) Everything possible should be done to prevent congestion, and to remove that already existing. Every attention should be

given to the restoration of the general system to the normal condition—especially should the blood and the nervous system be attended to. All weight should be removed from the large and heavy uterus. Nervous hyperæsthesia should be relieved by every possible means. The patient should rest in a horizontal position for several hours every day about noon. Sexual intercourse should not be practiced, or but very seldom, and with great care.

(3) The general treatment consists in change of scene (seashore, sea voyages, or mountains); plain, unstimulating, nutritious diet; the administration of ergot in the early stages; and, generally, tonics with saline laxatives.

(4) Local scarification of the cervix may be practiced, but is not as much employed as formerly. Vaginal injections should be used twice daily for fifteen or twenty minutes at a time, with as hot water as the woman can bear. They are best employed with a fountain syringe, and in the dorsal-recumbent position. Local alteratives, as iodine, should be applied thoroughly to the endometrium once a week, after which a glycerin tampon should be placed against the cervix, and allowed to remain there for twenty-four hours. Sometimes blistering the cervix by applications of cantharidal collodion does good. Galvanism has also been resorted to.

After the inflammation which follows operations on the cervix has subsided, the uterus in chronic metritis tends to undergo a process of involution, hence Martin, of Berlin, has advised amputation of the posterior lip in these cases.

HYPERTROPHIC ELONGATION OF THE CERVIX.

This disease is not nearly so frequent as the preceding, and consists of a real hypertrophy of the muscular and fibrous tissues of the organ.

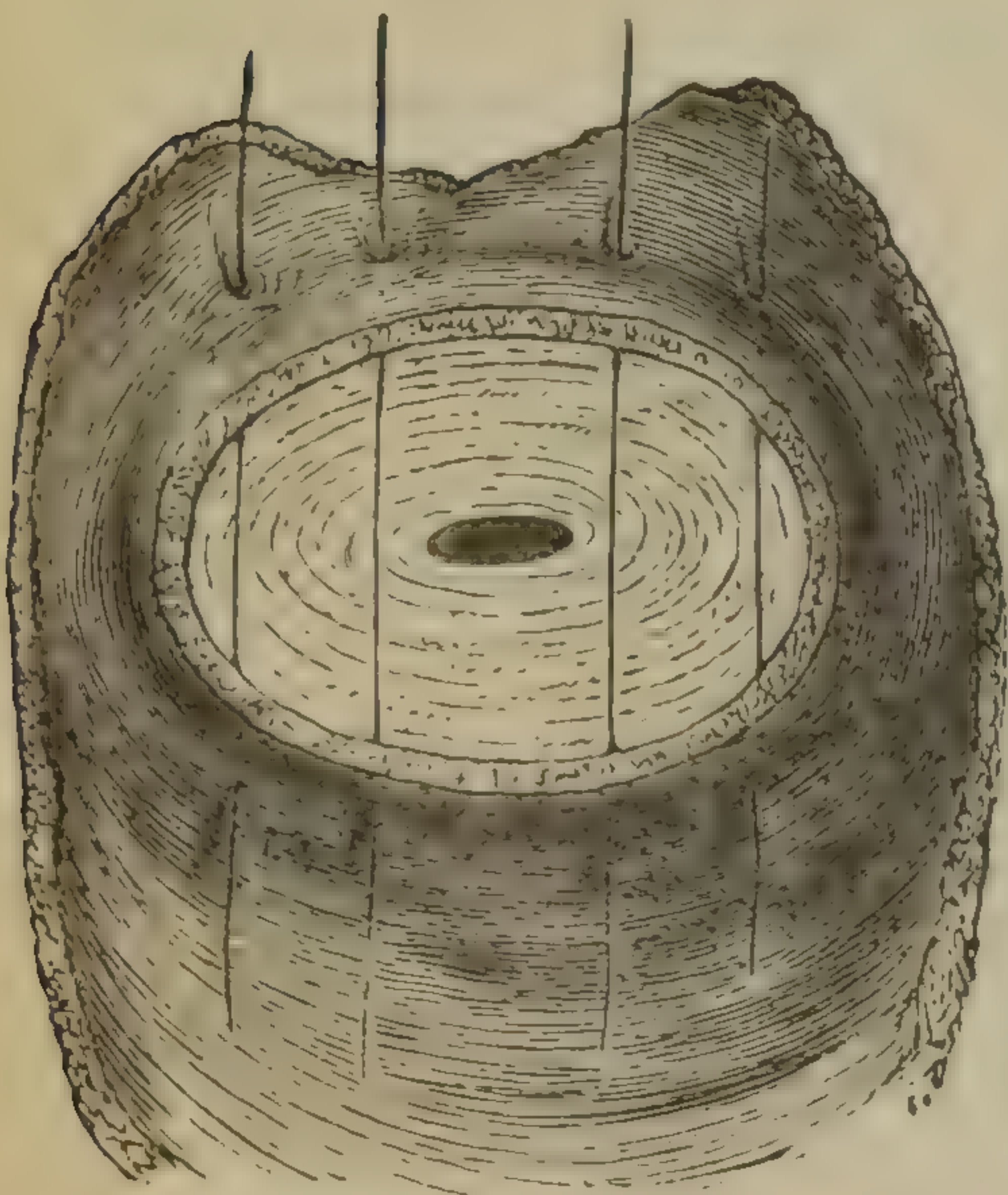
Symptoms.—The symptoms are those which would naturally be expected from a uterus unnaturally enlarged and heavy.

There is a sense of weight in the pelvis, and a feeling as of something pressing on the perinæum; sacralgia, leucorrhœa, sympathetic disturbances such as are common in uterine affections generally when of any duration, and sometimes menorrhagia, are

also very commonly complained of. The patient is generally sterile.

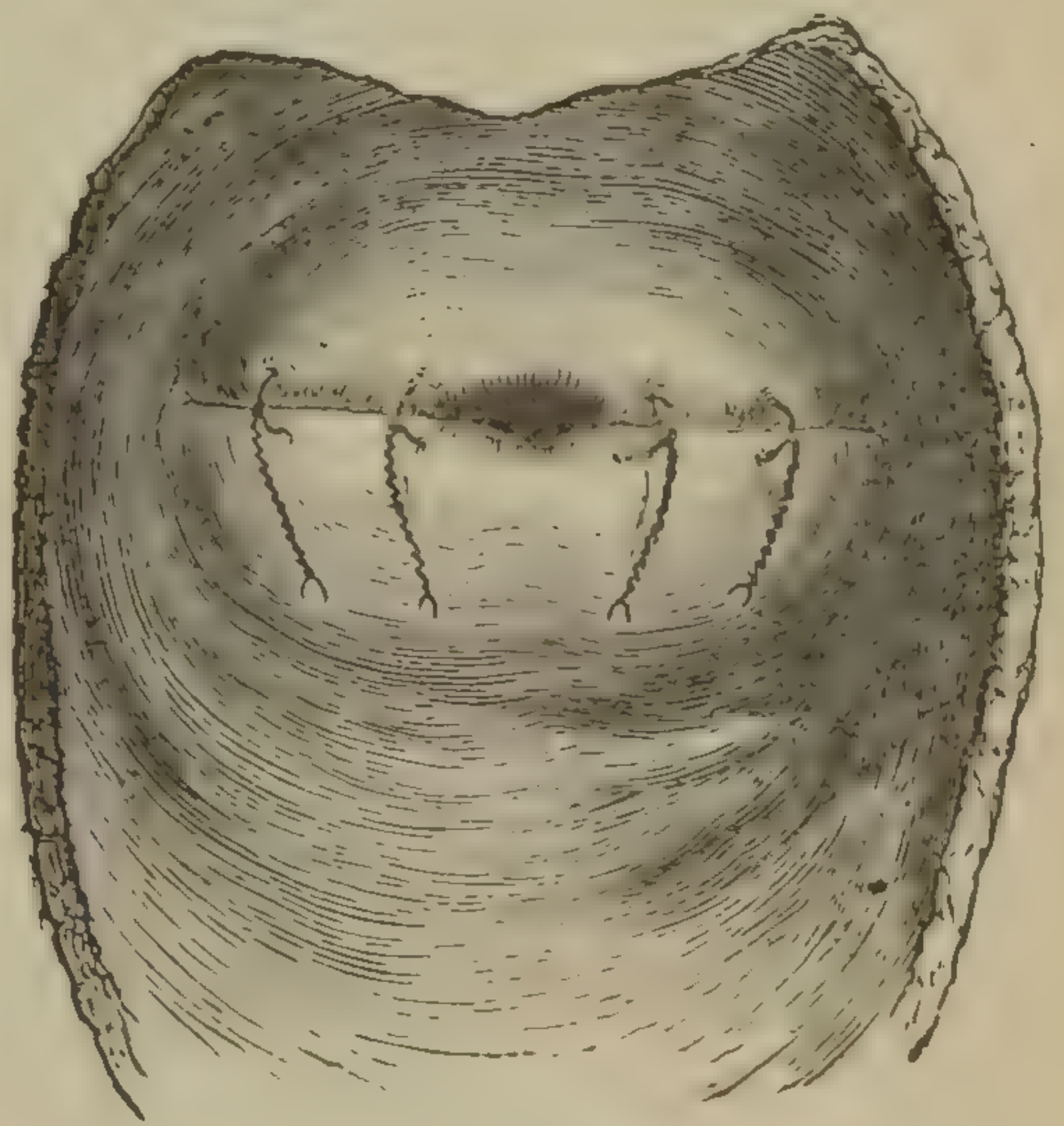
Diagnosis.—The cervix is found on *vaginal examination* to be more or less enlarged, either as a whole, or as to one or the other of its lips. When one lip only is enlarged, it may closely simulate a *uterine fibroid polyp*, while, when the entire cervix is affected, the disease closely simulates *prolapse of the uterus*, from which it may be diagnosed by finding the fundus in its normal situation on making a bimanual examination ; by finding that it is impossible to reduce

FIG. 35.



AMPUTATION OF THE CERVIX—
AFTER SIMS. (Byford.)

FIG. 36.



AMPUTATION OF THE CERVIX—
SUTURES TIED. (Byford.)

the uterus, as could be readily done if it were simply prolapsed ; by finding the vaginal insertion higher up than normal on the uterine neck, and by passing a sound which shows the uterine cavity to be increased in size.

Treatment.—The only effectual treatment for this condition is amputation, and this is justifiable when the patient suffers much inconvenience from the affection, as may be the case when the cervix is immensely hypertrophied, or when she is anxious to have children.

The cervix may be removed by the galvano-cautery, or by the knife, which is the method usually preferred. Several operations for the removal of the hypertrophied cervix have been invented, all consisting in division of the os almost to the vaginal insertion, thus making two flaps.

In Sims' amputation, the cervix is then cut through horizontally, almost on a level with the upper limits of the flaps, and sutures introduced in such a manner that the vaginal mucous membrane is united to the raw surface, an opening being left in the centre for the new os uteri.

Hegar amputates in the same way, but unites the mucous membrane of the outer portion of the stump with that of the cervical canal in the centre, and with the corresponding mucous membrane of the sides.

Schroeder forms anterior and posterior flaps precisely as in the foregoing operations, but he then removes a wedge-shaped portion of tissue from either flap, and brings the mucous membrane together in the same manner as is done in Hegar's amputation. This operation seems to give as good, if not better results than the others.

The after-treatment is that usual in all operations of any magnitude on the female genitalia.

UTERINE NEOPLASMS.

FIBROID TUMORS OF THE UTERUS.

These are the most frequent neoplasms of the female generative organs. They are said to be present in forty per cent. of women after thirty-five years of age, and are often seen at thirty. They are more common in the colored race.

Varieties.—A fibroid tumor may be *interstitial*, when it is developed in the coats of the uterus growing equally toward its peritoneal and mucous surfaces. It may be *sub-mucous* if it grow toward the cavity of the womb, or *sub-peritoneal* (*sub-serous*) if it grow toward the peritoneal cavity. As a rule, these tumors all begin as interstitial, and grow toward the cavity of the uterus, becoming polypoidal or not, as the case may be, or toward the

cavity of the peritoneum. If the latter, and it be polypoidal, it may have a long or short pedicle, and form attachments to neighboring viscera. The pedicle may atrophy, and the tumor remain free in the abdominal cavity; or the free tumor may form attachments and thus become transplanted to some neighboring organ.

Changes Occurring in the Tumor.—The tumor may atrophy spontaneously or as the result of ergot or electrolysis. It may undergo cystic degeneration either by a myxomatous degeneration affecting the interlobular spaces, or by an expansion of the lymph vessels. The fluid of fibroid cysts never contains cholesterin, which is found in the ovarian fluid. It may undergo softening and sloughing, usually beginning at the mucous surface and spreading centrifugally, the tumor being thrown off as a solid mass, or gradual suppuration, and gangrene may occur. Fibroids may also become calcified.

Symptoms.—Fibroid tumors may exist without any symptoms whatever, provided they grow slowly, do not attain a large size, and remain interstitial, or become sub-serous, and provided the woman does not bear children. They usually atrophy after the menopause.

When symptoms are present they will be due either to the pressure of large tumors upon adjacent viscera, blood vessels or nerves, or to menorrhagia and metrorrhagia, which are more frequently seen in the sub-mucous variety and least frequently in the sub-serous.

Dangers.—Death may occur from hemorrhage, from pressure interfering with function, from embolism, from septic infection, from peritonitis, or from ulceration and gangrene.

Diagnosis.—*Bimanual examination* will show the uterus enlarged, the cervix unusually hard, and the outline of the body irregular. The latter will be most marked in sub-serous cases.

The examining finger may find a mass dilating the cervix or projecting into the vagina, in cases of sub-mucous polypi.

The sound enters the uterine cavity, which is much enlarged and often tortuous in interstitial or sub-mucous fibroids, and may feel irregularities of the uterine wall. For this purpose a hard-rubber flexible sound should be used, or the very flexible silver probe, the former being the better. In cases of doubt it may be

necessary to dilate the cervix and examine the endometrium with the finger.

Treatment.—*If the pressure in the pelvis* is very great, an effort should be made to lift the mass out of that cavity by pressing it up with the finger while the woman is in the Sims position, and to maintain it there by a suitable pessary or abdominal support.

If it roll round in the abdomen and produce discomfort, an abdominal bandage should be worn. *Should there be excessive hemorrhage* it may be checked by ergot injected into the hypogastrium daily, or by the internal administration of cotton-root bark, by hot water injections or the use of the tampon. Churchhill's tincture of iodine or carbolic acid and iodine may be applied to the bleeding surface directly. *Should a polypus* project into the uterine canal, the cervix may be dilated and the tumor removed by the écraseur. An effort may be made to reduce the size of the tumor by the daily administration of ergot hypodermically or internally, by chloride of ammonium administered for a long time, or by electrolysis. Should all these measures fail and the pressure symptoms be severe, or the life of the patient be threatened by the hemorrhage, particularly if the menopause be distant, removal of the ovaries may be practiced. Sub-serous fibroids, even when pediculated, should not be removed unless hysterectomy is simultaneously performed, the mortality being greater after the former than after the latter operation.

SUPRA-VAGINAL HYSTERECTOMY.

Amputation of the body of the uterus or supra-vaginal hysterectomy is sometimes performed for the removal of large fibroid tumors which have resisted other treatment, and which by their pressure endanger the patient's life.

As it is an operation attended with some danger it should not be performed in cases of hemorrhage from the uterus unless other means of checking the hemorrhage have failed, as hemorrhage is usually due to sub-mucous fibroids, frequently to polypi, and sometimes to interstitial fibroids which are becoming sub-mucous. Hence dilatation of the cervix and removal of the tumor will usually check this symptom, without subjecting the patient to the risk attending a hysterectomy.

The same instruments, assistants and positions are necessary as in performing ovariectomy, (*q. v.*) with the exception that a large clamp for the uterine pedicle replaces the trocar of the latter operation.

The treatment before the operation is the same as that preceding ovariectomy; the abdomen is opened in the same manner as in that operation, great care being taken not to wound the bladder. After the hemorrhage is checked and the peritoneal cavity opened the relations of the tumor with the pelvic organs, its attachments, adhesions, etc. must be carefully investigated in order to determine the probability of its removal without too great risk.

If the tumor is large the incision may be extended upward, cutting the abdominal tissues with scissors until the upper border of the fibroid is reached, in order better to investigate adhesions and to aid in extraction.

Large vascular adhesions are apt to be found between the tumor and the omentum, containing veins, usually much dilated, and sometimes the omentum will have to be tied in several places before the adhesions can be divided without danger of hemorrhage.

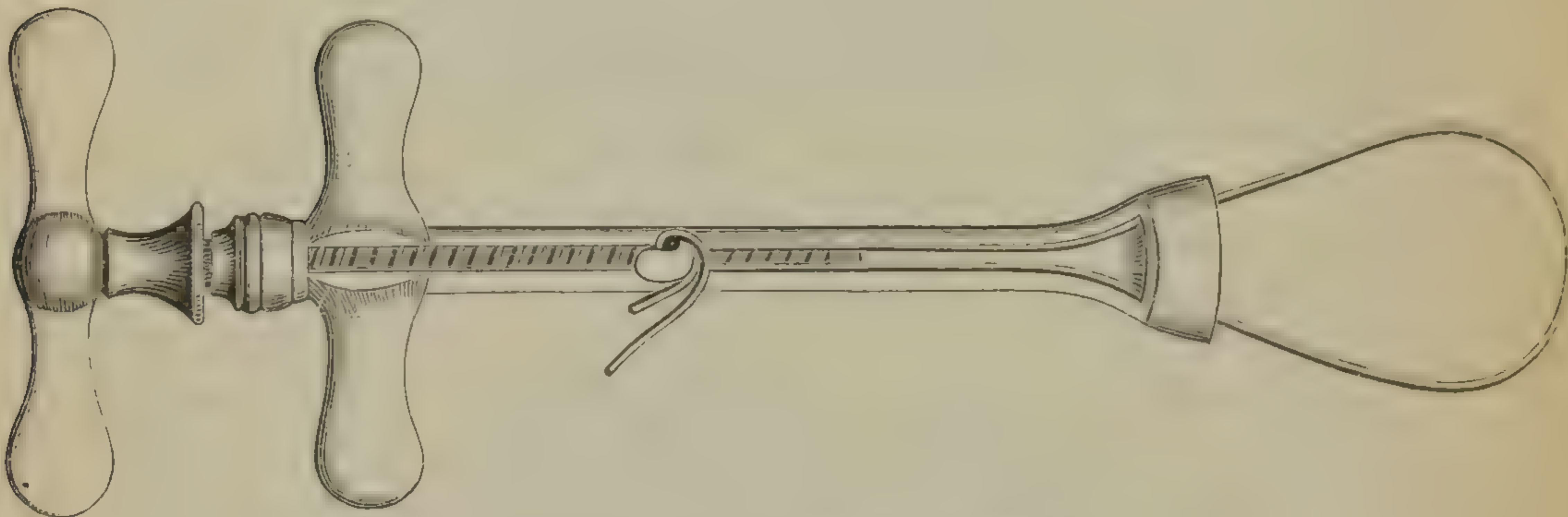
Intestinal adhesions require very careful management also, great care being necessary to prevent wounding the gut.

After the adhesions are divided the tumor is drawn out of the wound, care being taken that any small fibroids with slim pedicles which may be attached to its surfaces are not separated and left behind. A large flat sponge is now placed over the viscera to retain them in position and the relations of the uterus to its appendages and other pelvic structures carefully studied. Thin-walled cystic bodies are often found in the broad ligaments near the tube. They contain a thin, transparent, yellowish fluid. The relation of the pelvic organs are often completely altered, and great care and much study may be required in order to determine them exactly.

The clamp is now applied to the pedicle, and for this purpose Koerberlé's clamp is perhaps the best. If small, dense fibromata are found in the uterine wall at the level of the proposed pedicle it is often necessary to enucleate them, securing any bleeding vessels by the pressure forceps and applying the wire loop and pins to the portion of the capsule left behind. The uterine appendages should

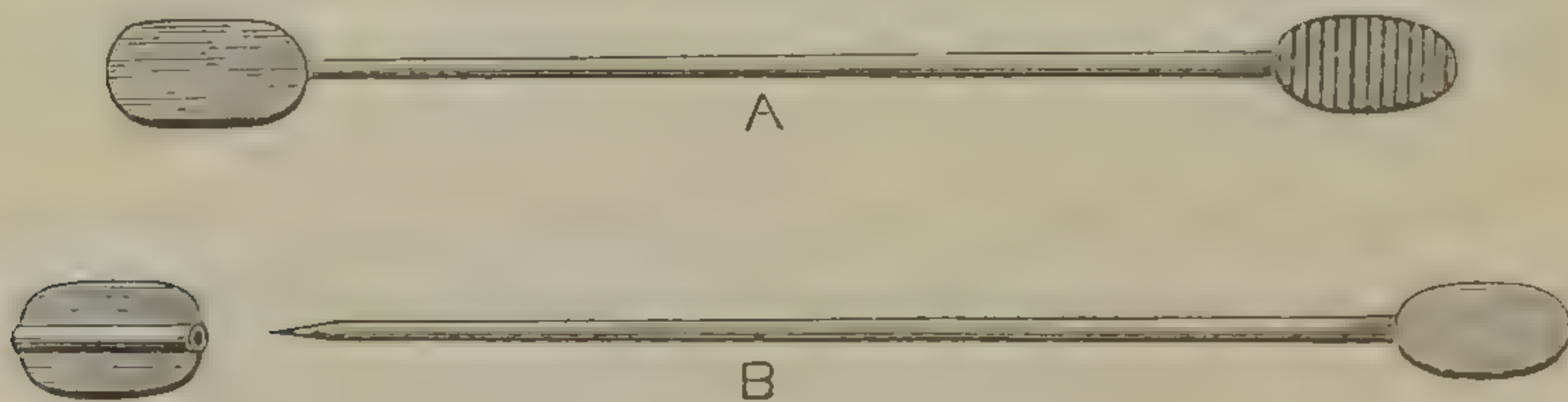
be included in the clamp; care must be taken that the bladder is not injured. The wire loop of Koerberlé's serre-nœud must be very carefully applied around the proposed pedicle so as not to include surrounding parts; it is better, when possible, to include the tubes, ovaries and the greater part of the broad ligament in the wire loop.

FIG. 37.

KOEBERLÉ'S SERRE-NŒUD. (*Doran.*)

If they cannot be thus included they had better be removed, as in the operation for ovariectomy. While the wire loop is being applied the assistant should draw the tumor well up. The free end of the wire is carried around the pedicle, passed under the bridge on the serre-nœud and twisted round the button. The wire is then

FIG. 38.

PEDICLE-PINS FOR HYSTERECTOMY. (*Doran.*)

tightened by means of the key. Pins should now be passed through the pedicle on its distal side. The points should be protected by a guard. The tumor is then cut away, and the wire of the serre-nœud tightened. The blood is washed away and the toilet of the

peritoneum performed (*vide* Ovariectomy). The stump should now be trimmed down and the edges stitched across from one side to another. It is then drawn through the lower angle of the abdominal wound, which is closed in the usual manner by sutures, the lower sutures being closer together than the upper ones on account of the traction exerted upon them by the stump. The wound is dressed as after ovariectomy. The stump should be carefully watched, and the clamp tightened in case any bleeding should occur. The distal part of the stump separates in two or three weeks; the pins are allowed to remain for a few days after the wire is removed. When cicatrization is well advanced the stump is allowed to slip back into the peritoneal cavity. The after treatment is the same as that for ovariectomy.

Schroeder, prefers the so-called *intra-peritoneal method* of treating the stump; in this method a rubber ligature is cast about the uterus and appendages below the tumor, and the latter is cut off in a wedged-shape manner, the wedge being on the portion removed.

The stump is trimmed, disinfected, sewed up with three rows of stitches, catgut being used for the uterine mucous membrane and for the peritoneal surface, while silk is employed for the sutures of the raw uterine tissues where the strain is the greatest, and finally dropped back into the abdominal cavity.

The abdominal wound is treated in the usual way.

The *extra-peritoneal method* has so far been followed by the lower rate of mortality.

MALIGNANT DISEASE OF THE UTERUS.

(I) CARCINOMA.

Cancer of the uterus almost invariably attacks the cervix. It is most common between forty and fifty, next between fifty and sixty, and next between thirty and forty years of age, but is rare at other periods of life. It is most frequently seen in multiparæ, and among the poorer classes; especially does it attack the white race.

Varieties.—Epithelioma, scirrhus, and encephaloid are all found, the first being the most frequent.

Symptoms.—*Hæmorrhage* occurs, early from increased vascularity of the tissues, and later from ulceration, as the diseased tissue breaks down.

The watery leucorrhœa, which consists of gushes of water, intermittent in character, leaving a yellow stain on the linen; is thin, glairy, usually with little consistence.

Pain is not common as an early symptom, but occurs later when the body of the uterus or the vaginal walls are attacked by the disease.

Offensive discharges, with the characteristic cancerous odor, resembling decayed flesh. These discharges do not occur before ulceration takes place.

Duration.—The average duration is eighteen months. It is usually longer in the scirrhus than in the encephaloid or epithelial forms.

Prognosis.—Death usually occurs from exhaustion, from hemorrhage, from septicæmia, or from uræmia.

Diagnosis.—A hemorrhage occurring after the menopause should lead to the suspicion of cancer. The history of the discharges, the characteristic odor, and the cachexia, will confirm the diagnosis, independent of a vaginal examination.

On digital exploration if an epithelioma be present, the finger will come in contact with a soft mass feeling like a cauliflower, which breaks down readily under the finger, bleeds profusely, is vividly red in color, and is usually attached to the anterior lip of the cervix.

After ulceration has taken place the finger feels a crater-shaped excavation in the cervix, with distinctly indurated margins, the ulcerated tissue breaking down readily under the touch and bleeding profusely.

In the early stages of scirrhus the cervix will be hard, almost cartilaginous in feeling, and somewhat enlarged, the os usually patulous, and bleeding readily at the touch.

In encephaloid cancer the cervix will be two or three times the normal size, the enlargement usually extending above the vaginal insertion, and feeling puffy, moderately hard, and nodular.

When ulceration has occurred the condition is similar in the three varieties. The cancer grows rapidly, involves the lymphatics, and connective tissue of the pelvis, and the uterus soon becomes immovably fixed in its position.

Careful rectal and recto-abdominal examination should always

be made to ascertain if there be lymphatic involvement, and to what extent adhesions may exist.

Treatment.—As the only radical treatment for cancer is entire extirpation of the diseased structure, if the examination has shown that the uterus alone is affected, and that the connective tissues and lymphatic structures are free from disease, the operation for removal of the entire uterus may be performed. As the mortality after this operation is exceedingly high, it should only be resorted to when the disease is limited to the uterus, as otherwise there can be no hope of curing the patient by this means.

Should this measure not be employed early, excision of the entire diseased, and some of the healthy structure, either by the *écraseur*, scissors, knife, or thermo- or galvano-cautery, followed by scraping the raw surface thoroughly with the curette or Simon's spoon, and cauterizing the scraped surface with the actual cautery, or with caustics, gives the next most favorable results. For this purpose a caustic consisting of a solution of bromide one part, iodine two parts, carbolic acid three parts, and alcohol four parts, or a paste of chloride of zinc, may be employed.

If the vagina is infected or if the uterus is immovable, no hope of cure can be obtained, but it is generally considered better to remove as much diseased tissue as possible, as in this way the excessive hemorrhage is checked. Some, however, regard this as bad practice, believing that the more the cancer is interfered with, the more likely it is to spread to adjacent parts.

To correct the offensive odor antiseptic injections, as permanganate of potassium, carbolic acid solutions, or thymol may be used, or iodoform suppositories may be inserted into the vagina.

For hemorrhage, removal of the diseased structure is the most efficacious remedy. Ergot or gossypium may be given internally, and alum or other astringent tampons may be used.

Constitutional treatment should never be neglected. Iron, arsenic and other tonics, plenty of fresh air, rich nourishing food, and good hygienic surroundings, materially aid in prolonging the life of the patient.

For the excessive pain, which usually comes sooner or later, opium or other anodynes are necessary.

WHEN CANCER OF THE BODY OF THE UTERUS is present the diagnosis is made by the hemorrhage, offensive discharge, pain, cachexia, and history of the case. Should any doubt exist, the cervix may be dilated, the uterus curetted, and the scrapings examined under the microscope.

The **Treatment** is essentially the same as that already described, but as pain is an earlier symptom, anodynes will have to be employed sooner in the case.

(2) SARCOMA.

This is comparatively a rare disease of the uterus, and nearly always attacks the body, not the cervix. It usually occurs in women under thirty years of age, more frequently in the sterile than those who have borne children, may be diffused under the mucous surface, existing in nodular masses, or form polypoid projections into the uterine cavity.

It may occur as primary disease, or as a secondary degeneration of fibroid or other connective tissue tumors.

The **Symptoms** are similar to those of cancer, but there is more pain, and the discharge is less offensive than in the latter disease.

The **Prognosis** is better, both as regards cure and duration of life (average three years), than in cancer.

The **Diagnosis** is made from the history of the case, the age of the patient, the fact that the cancer of the body of the uterus is rare, and by microscopical examination of the scrapings, which will reveal the characteristic round or spindle-celled sarcoma.

The **Treatment** is identical with that of cancer.

EXCISION OF THE ENTIRE UTERUS.

This operation may be performed for the radical cure of carcinoma or of sarcoma of the uterus, if the other pelvic organs are not involved—in other words when the disease is recognized in its earlier stages—provided the patient and her family desire it and thoroughly appreciate the gravity of the operation. It is the only chance which the patient has of a cure, and although the operation is in itself a dangerous one, yet it is the duty of the physician to lay the case plainly before the parties most interested,

and allow them to decide, *provided, in a case of cancer, a careful examination has shown that the connective tissue and glands of the pelvis are not involved in the cancerous process.*

(A) REMOVAL OF THE UTERUS THROUGH AN ABDOMINAL INCISION.

This operation was first invented and performed by Freund, formerly of Breslau. Prior to the operation it is desirable that the patient's health should be in as good condition as possible; she should therefore have appropriate treatment directed to her condition, for a few days at least, remembering, however, that time is a very important element in the case, and that should the connective tissue or lymphatics or the pelvis once become involved in the disease, all hope of success must be abandoned. The usual anti-septic precautions must be taken, the bladder must be emptied by a catheter, which had better be allowed to remain in situ, as a guide to the operator.

An incision is made in the median line of the abdomen in the same manner as in the operation of ovariectomy (*q. v.*), only it extends further downward, reaching almost to the symphysis pubis. If the abdominal walls are very tense it may be necessary also to partially divide the recti on each at their insertion into the pubis. The peritoneal cavity is opened in the usual manner after all hemorrhage has been checked, and the intestines drawn up out of the pelvis, and if there is not room for them above, they may be brought out of the abdomen and protected by cloths soaked in warm water rendered aseptic by boiling. This must not be done if it is possible to avoid it, as handling the intestine increases the liability to shock after the patient reacts from the anæsthetic. The uterus is now grasped firmly with a stout pair of forceps and drawn out of the pelvis.

The following description of the application of the ligatures, and figures, have been taken from Hart and Barbour's "Manual of Gynæcology."

"The broad ligament is ligatured on both sides in three portions, as follows: The uterus being drawn over to the opposite side to make the ligament tense, a needle, armed with a double silk suture (Fig. 39, 1), is passed from behind through the ovarian liga-

ment; the end, 2, of this thread is carried through the broad ligament just below its free margin; thus loop I is formed, which, when tied in front, controls the *ovarian artery*. The lower end, 3, is passed through the round ligament, and thus loop II is formed, which, when tied, controls the *pampiniform plexus*.

“The same is done on the opposite side; the threads are not yet cut away, but drawn upward by assistants.

“The ligature III dips into the fornix vaginae so as to control the

FIG. 39.

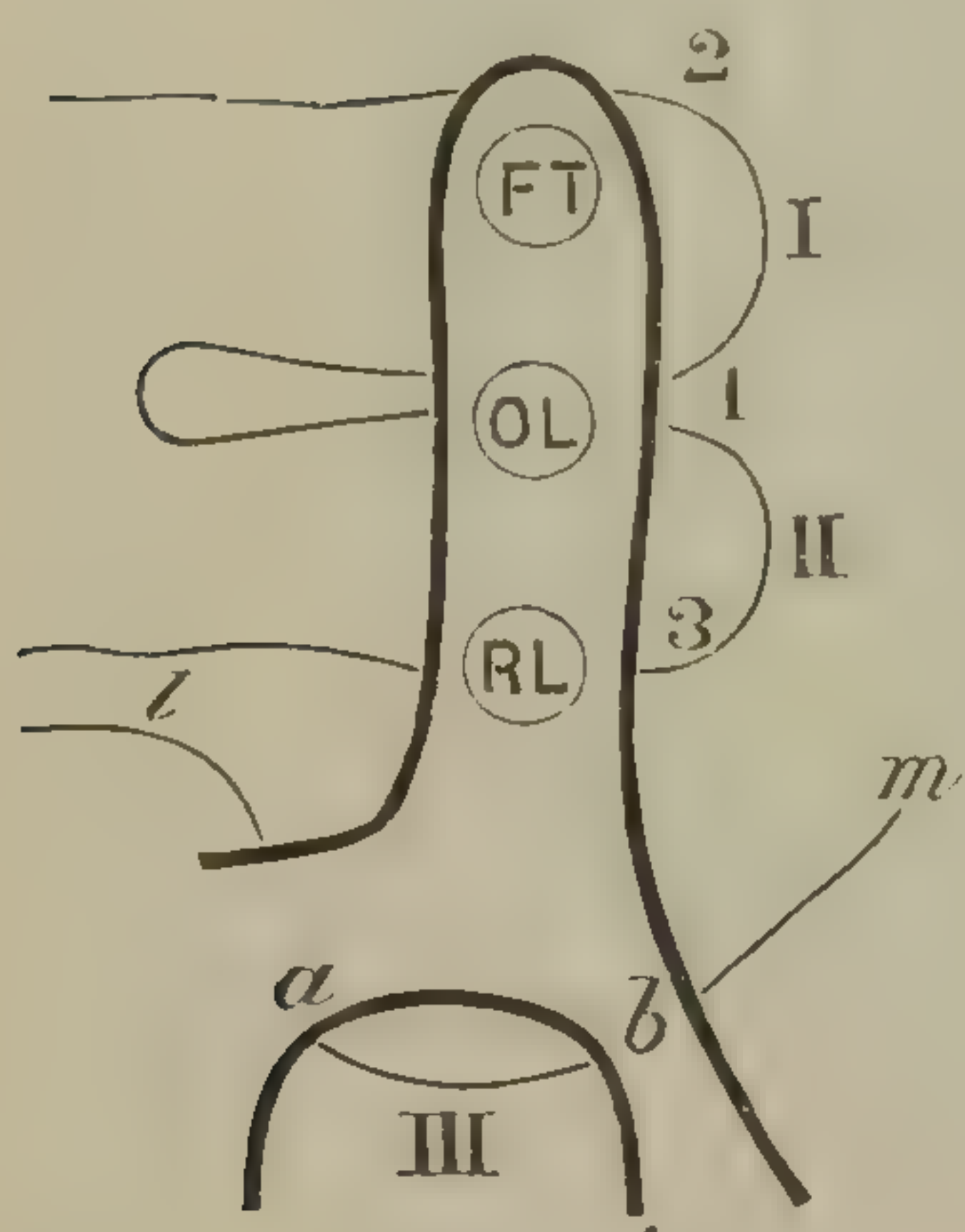
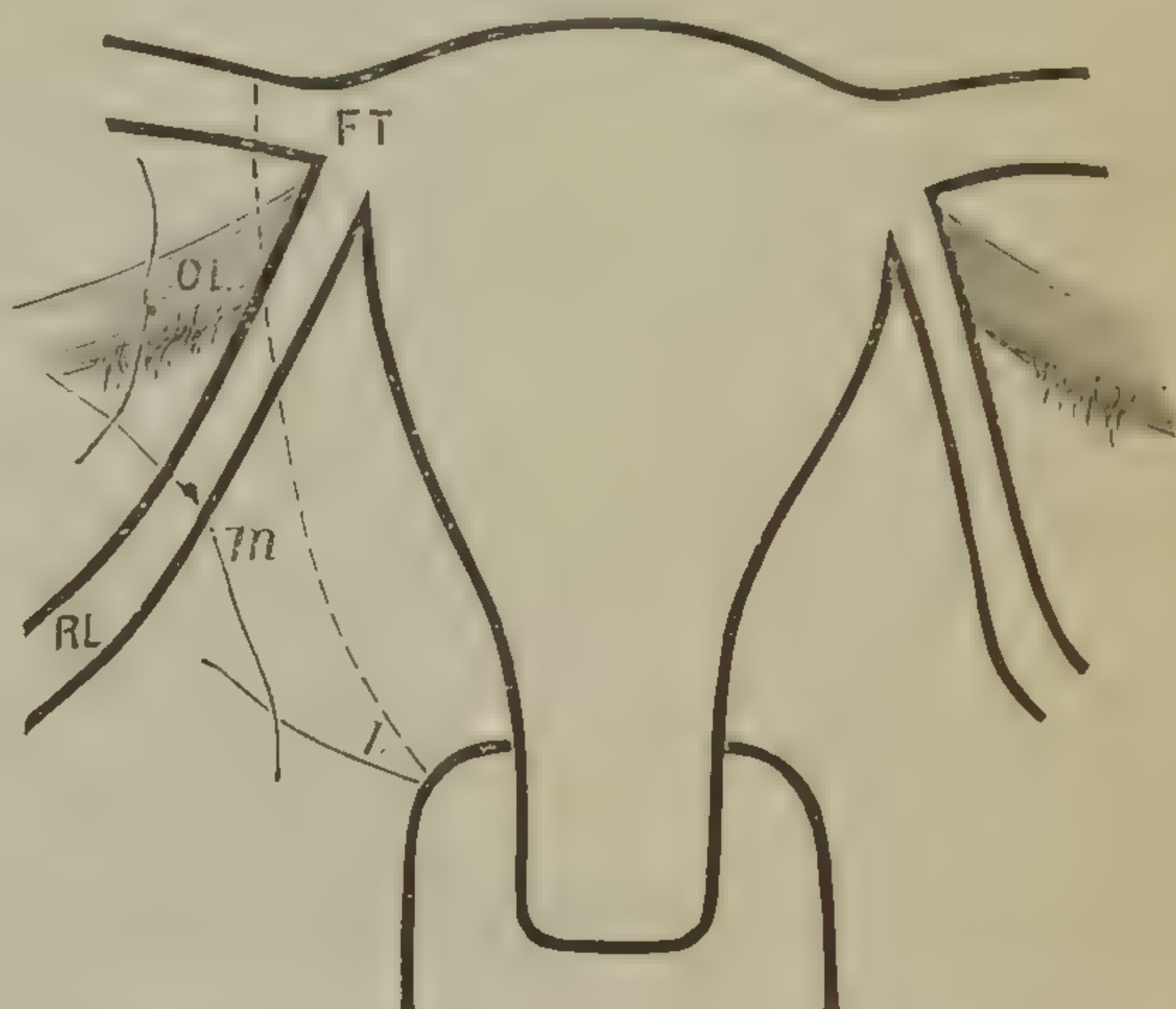


Diagram of a vertical section through base of right broad ligament, to show the position of the ligatures in Freund's extirpation of the uterus. The posterior aspect of the broad ligament is to the right. FT., oviduct; OL., ovarian ligament; RL., round ligament. The end, m, of ligature III, has not yet been carried through the round ligament. For other letters see text.

FIG. 40.



Uterus seen from the front. The ligatures shown only on right side to correspond with previous figure; they are drawn, but not tightened. The dotted line is the line of amputation. For letters see Fig. 39 and text.

uterine arteries. It is passed from the vagina on a curved needle sheathed in a trocar. Guided by the hand in the vagina, the needle is made to pierce the lateral fornix (at *a*); a piece of cork placed against the point facilitates penetration. The free end *l*, of this double thread is laid hold of, and while the needle is withdrawn and running on the thread, carries it through the lateral fornix (at *b*). The thread is then cut at *m*, beyond the eye of the

needle, so that the needle, still threaded, can be used to place a similar ligature in the lateral fornix of the opposite side. The end *m*, is carried through the round ligament at the same point as 3, so as to form the ligature III, which controls the *uterine artery*. It is important that it should include but a small portion of the vaginal roof, so as to compress the artery more securely."

The next step is to loosen the uterus from its attachments. This is done by dividing the vesico-uterine pouch with a scalpel (the catheter in the bladder being used as a guide to the locality of that viscus), the divided edge of the peritoneum over the bladder being sutured to the underlying tissues with fine silk. The peritoneum of the recto-uterine pouch is divided and attached to the underlying tissues in the same manner. The fingers are now used to separate the uterus from its anterior and posterior visceral attachments, and finally the vaginal mucous membrane having been divided in front and behind the cervix by a knife in the vagina, the broad ligaments are cut through with scissors between the uterus and the sutures, and the uterus is removed. The ends of the ligatures are brought out at the vaginal wound, a T-shaped drainage tube is inserted, all bleeding points are secured, and the abdominal wound is treated as in ovariectomy.

The mortality after this operation is very great, but not as great as that of cancer of the uterus. The removal of the entire uterus through the vagina, however, seems to be a safer operation, and should therefore be selected in suitable cases in preference to the one just described.

(B) REMOVAL OF THE UTERUS THROUGH THE VAGINA.

This operation has the great advantage of being much more rapidly performed, hence the patient is not kept under ether for such a length of time as in the preceding operation.

The patient is placed in the semi-prone position and Sims' speculum inserted into the vagina, or in the gluteo-dorsal position, and Simon's speculum and retractors used to separate the vaginal walls and expose the parts to view.

The cervix is grasped by a strong pair of volsella-forceps and drawn firmly downward to the vulval orifice, the mucous membrane of the vaginal fornices is divided, and the uterus freed as far

as possible from its attachments, without as yet dividing the peritoneum.

The recto-uterine pouch is now opened, and the uterus remains attached to the adjacent parts only by the broad ligaments and the utero-vesical fold of the peritoneum. In opening Douglas's cul-de-sac care must be taken not to cut too much laterally, or the broad ligaments may be wounded.

Two fingers of the left hand are now slipped into the recto-uterine pouch and over the fundus of the uterus, until the tips of these fingers press against the point where the peritoneum is reflected from the uterus over the bladder.

This portion of the peritoneum must then be divided with a scalpel or scissors cutting close against the uterus, and being guided by the fingers above, and by a catheter in the bladder in front.

The uterus is now only attached by the broad ligaments, which must be ligated before they are divided. In order to accomplish this, the uterus must be retroflexed so that its fundus is brought down through the wound in the posterior vaginal fornix. It is then seized with the vosella-forceps.

The broad ligament is transfixed by a needle armed with a double ligature, thus tying it in two portions in such a way as to occlude the vessels (*vide* Fig. 7, p. 22), and afterwards another ligature is cast around the entire broad ligament as a whole. If the ovaries and tubes are left, the application of the ligatures is usually not difficult, nor do they generally tend to slip, but when these parts are to be removed also, there may be great difficulty in adjusting them properly, and they do not always retain their place. At the same time it is desirable that at least as much of the tube as can be removed shall come away, for it is an integral part of the cancerous uterus. When the broad ligament of one side has been ligated, the uterus should be drawn toward that side, and the ligament of the opposite side similarly treated.

The uterus is then removed by dividing, with a knife or scissors, the structures of the broad ligament, between the ligatures and the uterus. The pedicles are brought out through the vaginal roof, and examined thoroughly to ascertain whether there is any oozing from them, and if so they must be secured before proceeding further.

It is not always easy or even possible to suture the vaginal wound. In these cases the vaginal flaps may be left free, trusting to the subsequent packing to prevent prolapse of the viscera until union takes place. It is always better, however, to employ sutures when it can be done. For this purpose the pedicles are brought out at the vaginal wound, and retained in place by a suture, which passes through the edge of the wound in the anterior fornix, through the pedicle above the ligatures, and through the wound in the posterior vaginal vault, thus closing the wound and fixing the stumps.

A drainage tube (either a long Keith's tube, or a Duncan's T-shaped tube) is inserted about half an inch beyond the vaginal wound and between the pedicles, and the vagina packed with iodoform wool. Any rise in the temperature, or any fetor about the discharge, necessitates a thorough washing out of the peritoneal cavity with boiled water or a mild antiseptic solution.

The iodoform wool must be frequently changed and often examined to note the character of the discharge. The after treatment is similar to that of any case in which a major operation has been performed on the female genitalia.

The vaginal stitches may be removed in about two weeks.

It is needless to say that this, as all other operations, must be conducted with due regard to thorough antisepsis.

LACERATION OF THE CERVIX UTERI FROM PARTURITION.

Lacerations of the cervix are commonly seen as the result of a first labor, and vary much in extent, depth and form. The circular fibres of the cervix being well developed around the os externum offer an impediment to the descent of the child's head, which is overcome partly by the downward pressure of the head and partly by the outward pressure of the bag of waters protruding through the orifice which they guard. As the labor proceeds these fibres yield more and more until finally the os externum is sufficiently dilated to allow the passage of the head of the child. In the earlier stages of dilatation these circular fibres contract synchronously with each contraction of the uterine body; but this

primary contraction gradually disappears as the parturition progresses.

Sometimes the resistance offered by these fibres is so great and the force exerted upon them by downward passage of the products of conception is so intense that a rupture occurs of greater or less extent and the child passes into the vagina partly through the os, partly through the tear which it has made.

Occasionally the laceration involves the circular artery of the cervix, and hemorrhage more or less profuse may occur.

Should much bleeding take place after labor, the uterus being contracted and the blood not coming from any rent in the vaginal walls or pelvic floor, a laceration should always be suspected, and if of great extent or if accompanied by much bleeding, ligation of the vessel, or preferably a primary operation, the sutures being so applied as to compress the circular artery, should be performed.

As a rule, however, lacerations occurring during labor are not sought for by the obstetrician, and, if septic infection does not occur, are unnoticed until after the puerperal period.

It has been maintained by some authorities, and is a popular idea, that lacerations of the cervix can always be avoided if the parturition is skillfully managed by the attending accoucheur. This is probably not the case, as lacerations occur under the management of the very best practitioners, and slight lacerations are of such frequent occurrence that a sweeping assertion of this kind would be equivalent to a charge of carelessness on the part of obstetricians generally.

Unquestionably lacerations are more frequent in the hands of the inexperienced or unskillful. The too early rupture of the bag of waters, and allowing the woman to bear down before the cervix is properly dilated, certainly favor laceration.

Results.—A recent laceration may be immediately productive of harm, or its consequences may not be seen until the lapse of some time.

(1) *Hemorrhage* sometimes occurs, but is usually slight.

(2) *Septicæmia* is also favored by the laceration, as septic material more readily finds access through an abraded surface.

(3) *Inflammation* frequently takes place, often accompanied by a slight lymphangitis, which, extending to the connective tissue on

either side of the uterus, ultimately produces cicatricial tissue, which by its contraction draws the uterus toward the side of the pelvis, disturbing the blood supply by altering the normal relations of the vessels.

(4) The inflammatory action resulting from the laceration *usually retards involution* and frequently results in a low grade of inflammation of the uterine parenchyma, producing the condition already described as chronic parenchymatous metritis, areolar hyperplasia, or sub-involution

(5) *The cicatricial tissue* resulting from the laceration may compress the nerve endings or the vessels, or, by the induration which it causes, prevent the normal swelling which occurs in the uterus at the menstrual period, and thus occasion various functional disturbances or pains.

(6) *Cervical catarrh* frequently results, caused by endometritis, due to the heavy and enlarged uterus and to the interference with the venous circulation in the organ.

Symptoms.—Laceration of the cervix may exist without any symptoms whatever; usually, however, there are various disturbances, either of the system at large or of the functions of the uterus, due to the changes produced by the laceration. These symptoms usually point either to a uterine catarrh, to the hyperplasia, to the chronic cellulitis, or to some displacement depending upon these conditions. Thus, *uterine leucorrhœa* or *vaginal leucorrhœa* may be present; *sterility* is common; *pain* is experienced, particularly at the menstrual period, usually referred to the back, sometimes to the hypogastric region as well, often accompanied by a dragging sensation and associated at first with increased menstruation, sometimes amounting to an actual flooding, and afterward with a diminution in the flow. *Dyspareunia* is sometimes experienced.

Diagnosis.—*On digital examination* the usual signs of chronic parenchymatous metritis, usually accompanied by chronic catarrh, are present. The examining finger finds the cervix much enlarged, frequently slippery from the catarrhal secretions, hard and indurated from cicatricial tissue, the os being very patulous and extending in a simple laceration toward one or the other side of the vaginal wall.

If the laceration be severe the finger may pass into the cervical canal as high as the os internum.

The laceration may extend in various directions, being either unilateral, multiple, bilateral or stellate.

To verify the diagnosis and differentiate it from eversion of the cervical mucous membrane the patient should be placed in the latero-abdominal position and the parts inspected through a Sims speculum. In case of doubt, a tenaculum may be hooked into either lip of the uterus and the parts approximated, when the laceration will be distinctly seen.

Treatment.—The treatment will depend upon the severity of the laceration and upon the complications resulting therefrom.

If eversion of mucous membrane is present with the formation of Nabothian cysts, they must be punctured and their contents allowed to escape, while any inflammation must be treated by applications of Churchhill's tincture of iodine two or three times a week, by glycerin tampons and by copious injections of water, as hot as the patient can bear them, repeated at least twice in twenty-four hours, and conjoined with rest.

A proper pessary, by retaining the uterus in a natural position and preventing excoriation from friction against the vaginal walls, will materially aid in reducing inflammation.

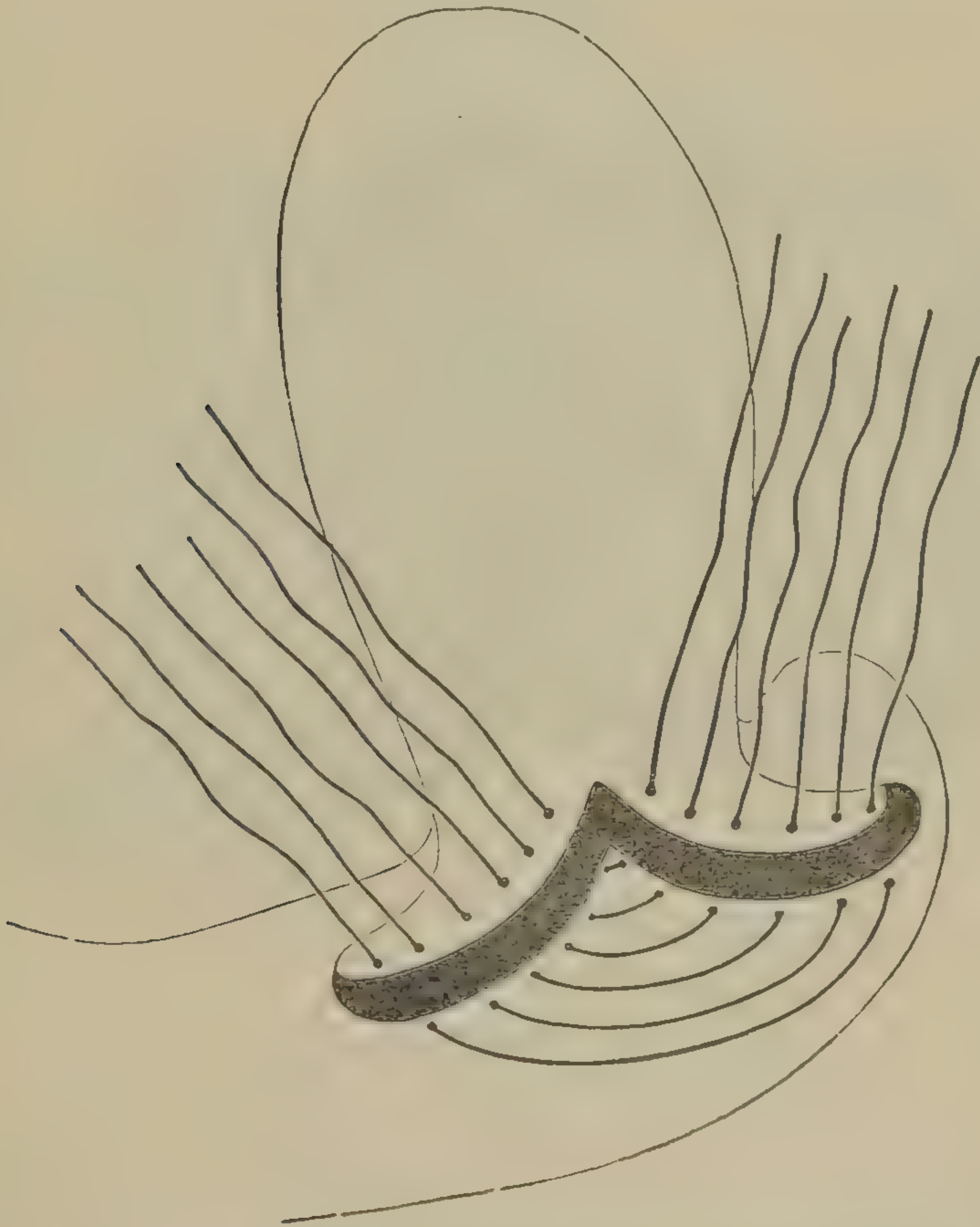
All other complications which are present should be removed, as far as possible, by appropriate treatment before an operation is thought of.

The time selected for an operation should be from one to two weeks after the menstrual period, as, if it be performed too soon after the last period, the resulting congestion may reproduce the flow, or if it is near an expected period the flow may be anticipated, and, in either case, union retarded, if the result of the operation is not endangered. The patient should be in good health for this, as for any other plastic operation.

Prior to the operation the patient should take a copious injection of very hot water in order, by its secondary effect upon the uterine vessels, to prevent much bleeding. She should then prepare herself as if for bed and should be thoroughly etherized, after which she is lifted, laid on a hard table which has been protected by several thicknesses of blankets or an old quilt, and covered by a gum

cloth, which may project over the foot of the table and be collected in a bucket placed underneath, so that any blood or the water used in douching the parts after the operation may not soil the floor. The patient is then placed in Sims' position, or in the lithotomy position, particularly if the operator has only one or two assistants, in which case Clover's crutch may be used to retain the thighs

FIG. 41.



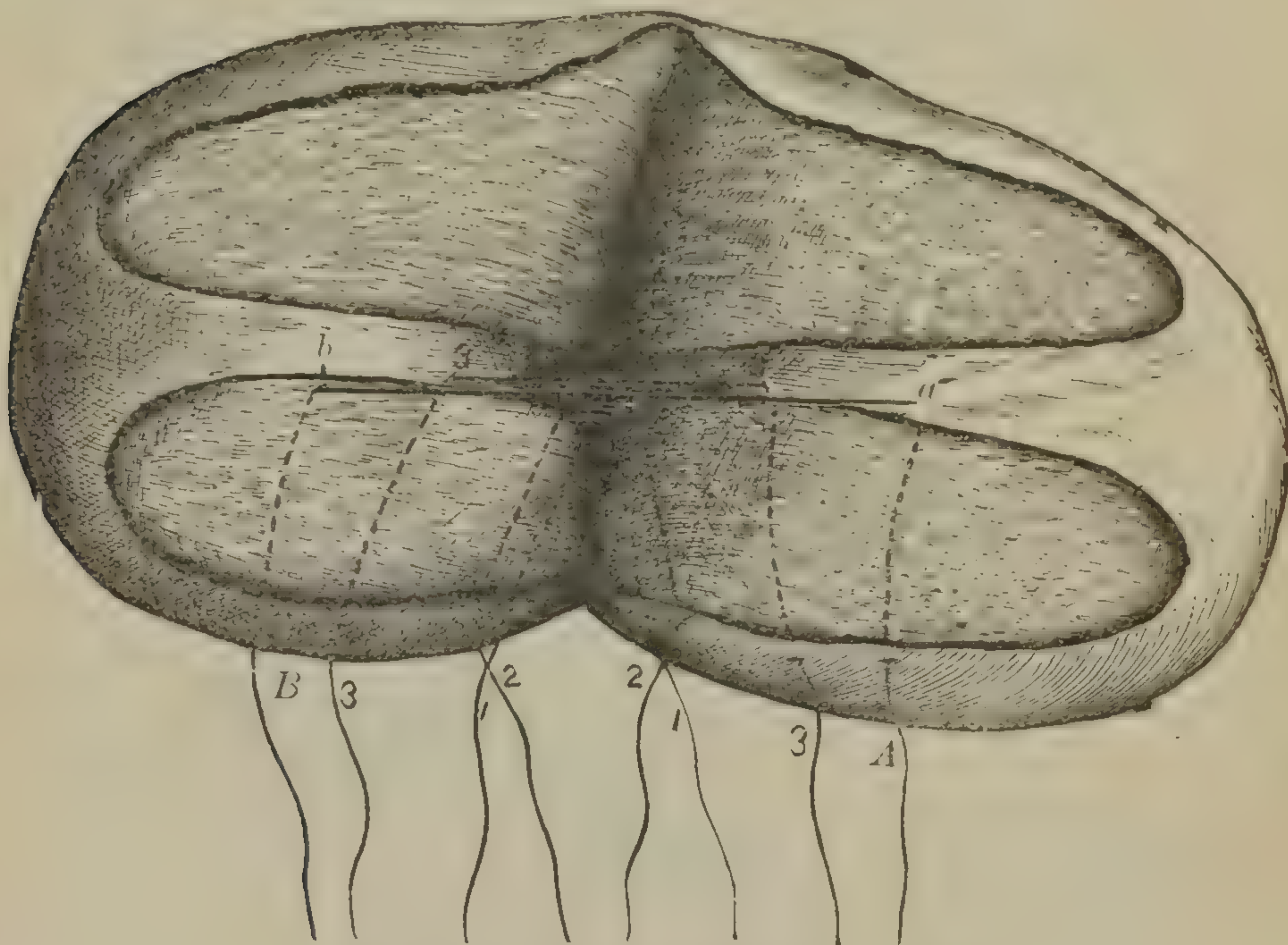
and legs in a flexed position. Sims' or Simon's speculum is then inserted and the uterus drawn toward the vulval outlet by a tenaculum or volsella-forceps engaged in the lips of the cervix.

A strong needle armed with a double ligature is then passed through the cervix from before backward, perforating each lip of the laceration, the thread being then caught in the centre and drawn

down so that two loops are formed, one connected with either labium, which are thoroughly under control by this means, when, after the division of the ligature in the centre the ends passing through either labia are tied together. These loops are then given to an assistant, who thus has entire control of the cervix, being able by drawing the loops apart to separate the edges of the laceration or by drawing them together to approximate the surfaces.

The speculum and tenaculum are then withdrawn and the oper-

FIG. 42.



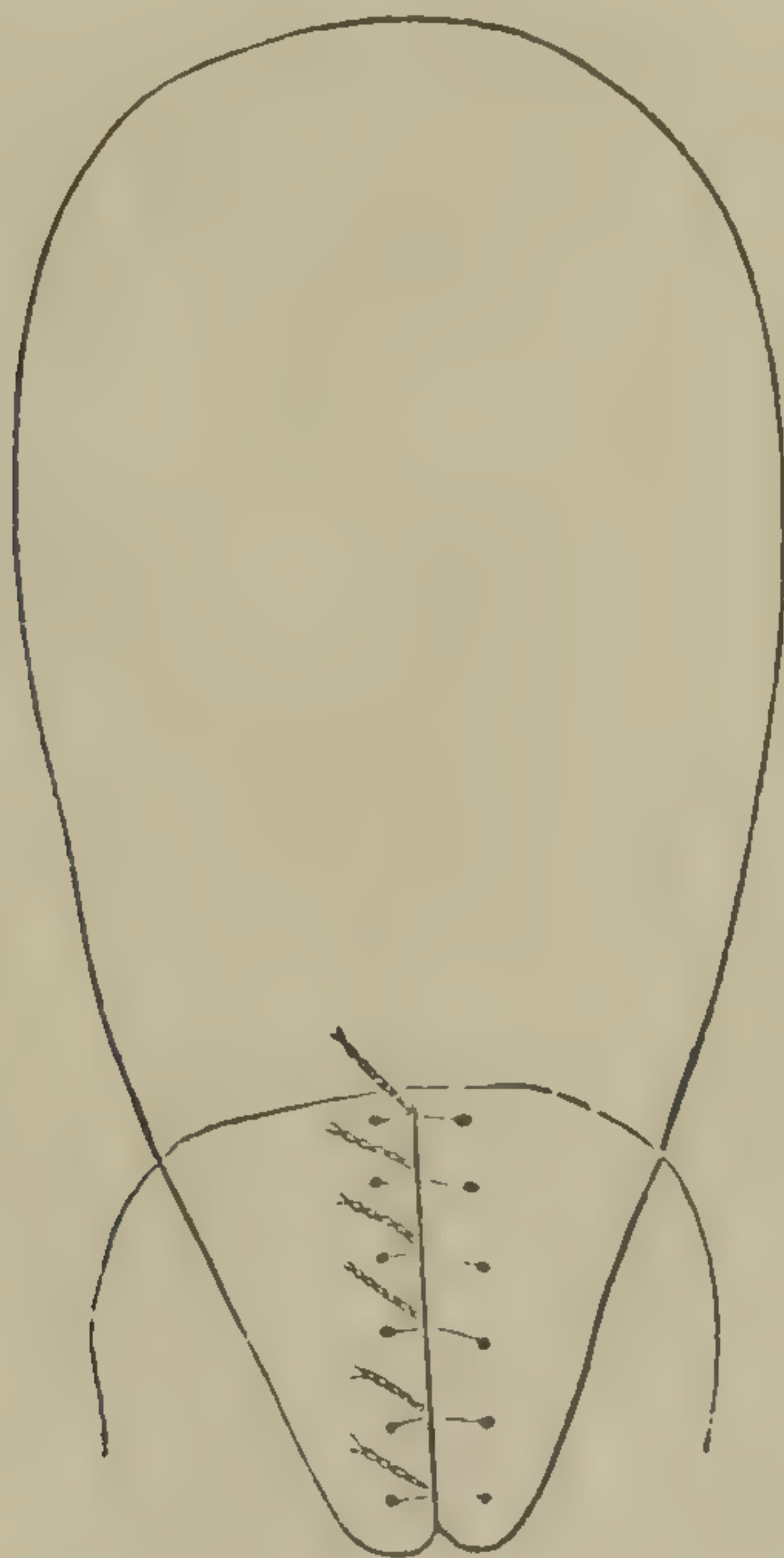
THE MODE OF PASSING THE SUTURES. (Byford.)

ator commences to denude the edges of the laceration, being careful to remove all the cicatricial tissue and to leave a strip of cervical mucous membrane which will afterwards form the canal. The denudation may be performed either with a knife or curved scissors, the cicatricial tissue being grasped by a tenaculum or a fine-toothed forceps. It should be accomplished in a single strip for either lip if possible, as in this way the operator is more certain that he has not left any islet of tissue behind. Emmet's scissors

are very useful in this operation, as they are in pairs, adapted respectively to the right and left hand. After one lip has been denuded the corresponding lip should also be stripped of cicatricial tissue in like manner, so that the two raw surfaces can be brought in accurate juxtaposition when approximated.

A very important step in the operation is the removal of all cicatricial tissue high up in the angle of the laceration, as, if any remnant of this is left, the success of the operation may be en-

FIG. 43.

THE SUTURES PROPERLY PLACED AND TWISTED. (*Byford.*)

dangered or much pain will be experienced after the wound is healed, from pressure on the nerve endings by the cicatricial mass.

The finger of the operator should now be passed thoroughly over the denuded surface to ascertain if any remnant of indurated tissue has been left, and if such is found it should be promptly removed.

In cases of double laceration a similar operation should be performed on the other side.

If the laceration is stellate the procedure will vary in accordance with the direction of the tears, those of larger size being freshened and the smaller ones, particularly if not deep, left, in the expectation that they will contract as the uterus undergoes involution after the operation. The parts should now be thoroughly cleansed with boiled hot water or an antiseptic solution to remove all blood clots or shreds of tissue which might interfere with union by the first intention.

The sutures are now introduced. Strong curved needles armed with silver wire, silkworm gut, or catgut are used and inserted on the outer surface of the flap, an eighth to a quarter of an inch from the denuded surface, carried parallel with it through the tissues, brought out at the margin of the endo-cervical mucous membrane, reinserted into the posterior lip and brought out at a corresponding point on its vaginal surface. After a sufficient number of sutures have been passed the part should again be thoroughly douched and the sutures tightened and tied, shotted or twisted.

The vagina should then be thoroughly cleansed, a sound introduced into the uterus to be sure that the canal is patulous. The loops of thread by which the uterus has been held are now divided and removed, the womb is replaced in its normal position, and a pledget of cotton inserted into the vagina.

The **After-treatment** consists in keeping the patient perfectly quiet in bed for ten days or two weeks, cleansing the vagina twice daily with warm antiseptic solutions, having the bowels moved daily by gentle laxatives and enemata, drawing off the water for the first few days to prevent distention of the bladder or straining and giving a mild, easily digested diet.

After ten days or two weeks, if the union is well advanced, the stitches may be removed, if wire or silkworm gut have been used.

A uterus thus operated upon is no more likely to be lacerated at a subsequent labor than is a uterus which has never been torn. Nor is dilatation slower if the original laceration has been a simple unilateral or bilateral tear.

DISEASES OF THE OVIDUCTS.

CATARRHAL SALPINGITIS.

This is of more interest from a pathological than from a practical standpoint, as it is a disease which cannot be diagnosed, and consequently cannot be treated during life.

It consists of a catarrh of the mucous lining of the tube, and may be either acute or chronic. It is always secondary to endometritis.

The other coats of the oviduct may become inflamed, thus giving rise to *perisalpingitis*, which is often seen as part of a general or of a local peritonitis; or to *mesosalpingitis*, neither of which, however, can be distinguished during life.

HYDROPS TUBÆ.

This affection results from some stenosis of the oviduct, or from the dilatation which usually occurs in cases of chronic catarrhal salpingitis, when of any duration.

It is also called *Hydrosalpinx*, and consists of a serous effusion occurring into the cavity of the dilated oviduct, which also becomes atrophied. Strictures take place in various parts of the tube, and thus cysts are formed. The mucous membrane and muscular coat become so much thinned that they almost disappear.

The fluid contains cholesterin, and when it has accumulated to a certain extent, often escapes into the uterine cavity.

On **Examination**, an elongated, dilated, sausage-shaped tumor is discovered, high up in the pelvic cavity, which can be best studied on rectal, or recto-abdominal examination.

The **Diagnosis** has been sufficiently discussed under the head of recto-abdominal examinations.

The **Treatment** consists in the removal of the tubes and ovaries.

PYOSALPINX

Consists in the accumulation of pus in the oviducts, and may be either *acute* or *chronic*.

The symptoms, physical signs and diagnosis have

been sufficiently discussed in speaking of recto-abdominal examination.

The **treatment** consists in the removal of the ovaries and oviducts.

HÆMATOSALPINX.

This consists in a collection of blood in the oviduct, which is dilated. It is frequently associated with retention of the menstrual fluid in the uterus, due either to atresia of that organ or of the vagina.

The **differential diagnosis** between this and the two former affections is difficult, often impossible. It has been mistaken for a fibroid tumor and also for a small ovarian cyst. When diagnosed the **treatment** should be directed towards removing the condition on which it depends.

OÖPHORECTOMY.

The removal of the ovaries alone or together with the tubes, when either of them are diseased, but only slightly if at all enlarged, was first proposed by Dr. Battey, of Rome, Ga., in 1872.

It has been performed for the relief of severe dysmenorrhœa, to arrest the growth and control the bleeding from uterine fibroids, in hystero-epilepsy dependent upon ovarian irritation, for the removal of the ovaries when the vagina or uterus are absent, for prolapsed ovaries which are fixed by adhesions, and for the diseases of the tubes just enumerated.

The **operation** may be performed either through the vagina or by laparotomy.

In the former method the patient is etherized, placed in Sims' or the lithotomy position, the cervix grasped and drawn down with the volsella-forceps, and the vagina thoroughly washed out with antiseptic solution. An incision is now made in the posterior vaginal wall for about an inch and a half, the peritoneal cavity opened and the index finger inserted while supra-pubic pressure is made by an assistant. The finger hooks the near ovary and draws it down through the wound.

A ligature is now applied, by transfixing the hilus of the ovary

with a needle threaded with a double ligature. The loop is cut and one thread tied around one-half of the base and the other around the other, taking care to twist the ligatures in the same manner as in ovariectomy.

The ovary is then cut off and the ends of the ligatures cut short. The other ovary is drawn down and treated in the same way.

Before the wound is closed the operator should examine carefully to ascertain if a third ovary be present.

A drainage tube is now inserted and the vaginal wound sutured. The parts should be thoroughly washed with a weak antiseptic solution twice daily.

The after-treatment is the same as in ovariectomy.

In removing the ovaries and uterine appendages by abdominal section an operation very similar to that of ovariectomy is performed. The incision is made in the median line, from two and a half to four inches in length; bleeding is arrested and the peritoneal cavity opened; the fingers are passed in, the uterine fundus is touched, and exploring from this laterally the oviducts and ovaries are recognized. If there are no adhesions, they are hooked up by the fingers and drawn out through the incision.

The ligature is then passed as in ovariectomy, as close to the uterus as possible, and the ovaries and tubes removed; the peritoneal cavity is carefully cleansed and the wound sutured as in ovariectomy.

These operations should be performed only as a last resort.

DISEASES OF THE OVARIES.

The ovaries may be displaced in various directions: during pregnancy, when the uterus rises into the abdominal cavity the ovaries are carried up with it, lying on either side of the fundus, their long axis being parallel with that of the uterus, on account of the change in the action of the broad ligament.

They may also be elevated if the uterus is enlarged from any other cause, such as fibroid tumors, etc.

When the uterus is retroverted or retroflexed the ovaries will

also be displaced backward and downward, sometimes occupying Douglas's cul-de-sac, often giving rise to more trouble than a displaced uterus and offering an obstacle to its reduction. Occasionally a hernia of the ovary takes place through the inguinal canal and sometimes it passes completely out of the canal and lodges in the labia majora.

Symptoms.—When the ovaries are displaced in the pelvic cavity the patient is apt to suffer with backache, pelvic and sacral pain, and sometimes neuralgia in various parts of the body, occasionally weight and a bearing-down sensation in the pelvis, particularly at the menstrual period, and frequently disordered menstruation, all of which are probably due to disturbances in the circulation of the ovary.

The general symptoms are such as have already been mentioned in connection with uterine disease, and which are frequently spoken of under the general term of *ovarian irritation*.

Diagnosis.—The diagnosis of ovarian displacement has been discussed in detail in connection with gynæcological examinations, and it is here only necessary to state that the ovary is recognized by its shape, size, tenderness, and, usually, by its mobility.

Prognosis.—If the displacement causes much irritation the prognosis as to complete cure is usually rather unfavorable.

Treatment.—The general health should be sedulously attended to, and if there is much prostration, absolute rest in bed, and small amounts of food at frequent intervals, gradually increased in quantity, and combined with systematic massage, as in the Weir Mitchell treatment, should be adopted. A displacement should, if possible, be reduced and the uterus and ovary properly supported by a pessary. In extreme cases the ovaries may be removed, if every other method of treatment has failed, either by laparotomy or Battey's operation.

INFLAMMATION OF THE OVARIES.

ACUTE OVARITIS.

This condition is usually accompanied by local peritonitis or cellulitis; suppuration rarely occurs except during a puerperal septicæmia.

As simple inflammation of the ovary uncomplicated by inflammation of the surrounding structures is a very rare affection, the diagnosis and treatment of this affection will be considered in connection with the para- and peri-metritis.

CHRONIC OVARITIS.

Chronic congestion and inflammation of the ovaries are probably by no means rare affections, and are the conditions that have given rise to so many operations for the removal of these organs the past few years.

The pathology of these affections has not yet been fully investigated, but it seems probable that it is generally the stroma which is affected by the inflammatory process.

Causation.—Inflammation of the ovaries is usually secondary to disease of the surrounding structures. It is generally believed that the virus of gonorrhœa, finding its way through the uterus and oviducts is one of the most common causes of inflammation attacking these organs. Excessive and prolonged venereal excitement, or any other cause which determines blood to the pelvic organs may produce this affection.

Symptoms.—Pain is usually a prominent symptom, not confined to the region alone, but radiating to the sacral region, down the thigh, and even to the hypochondriac or intercostal regions. It is usually increased at the menstrual period.

Functional derangements are also common. Menorrhagia is frequently seen, as is also amenorrhœa, and the woman is generally sterile. When pregnancy occurs in these cases, it is apt to be followed by abortion, probably caused by some imperfection in the development of the ovule.

The patient also suffers from various nervous disturbances, is apt to be the subject of hysteria, or even of hystero-epilepsy, and occasionally, as the result of long-continued disease, develops symptoms of melancholia or other form of insanity.

Diagnosis.—The diagnosis of this disease has been pointed out when considering vagino-abdominal and recto-abdominal examinations. The symptoms should also be taken into account; the fact that they are aggravated at the menstrual period, and that pressure on the ovary may produce the symptoms from which the

patient suffers, even when they are temporarily absent, should be given due weight in the formation of a diagnosis.

Prognosis.—Regarding the prognosis of this affection opinions differ. Mild cases, if they cannot be cured, can often be benefited until the occurrence of the menopause, when the symptoms will ameliorate or pass away of their own accord. In graver cases the prognosis is more doubtful.

The prognosis after removal of the ovaries, as to permanent cure, is not always certain. In many cases the nervous disturbance and pain continue for some time, and in some no relief seems to follow the operation.

Treatment.—An endeavor should be made to build up the health in general, by rest, good food, and systematic exercise, when she can take it. Tonics should be administered, especially iron and arsenic, if she is anæmic, and any local affection of the uterus must be treated. Saline purgatives may be occasionally administered.

Counter-irritation should be applied over the ovarian region by iodine or blisters, and glycerin tampons, hot douches and other general remedies employed. It is only when a faithful trial of these means has failed to accomplish any result that oöphorectomy should be thought of.

TUMORS OF THE OVARY.

To understand the pathological anatomy of the ovary it is necessary to have a clear idea of its development and anatomical structure; as these have already been considered it will not be necessary to do more than allude to them again.

It will be remembered that the germ epithelium as it became enclosed in the growing connective tissue of the ovary, gave rise to the appearance of tubules penetrating the ovarian stroma, and that these were called Pflüger's ducts. These, according to Waldeyer, are the origin of ovarian cysts, their connection with the surface being cut off and the cells which line them secreting fluid.

The ovisacs also may undergo degeneration, and instead of rupturing at the menstrual period, continue to distend by accumulating fluid, and thus form a pathological cyst.

Degeneration of the corpus luteum is also supposed to result in ovarian tumors.

Noeggerath believes that the cellular elements found on section of ovaries, which undoubtedly are the sources of origin of ovarian cysts no matter what their nature may be, consist principally of diseased blood vessels.

Dermoid cysts seem most probably to owe their origin to invagination of the epiblast, which becomes included in the ovarian structure during the early embryonic period.

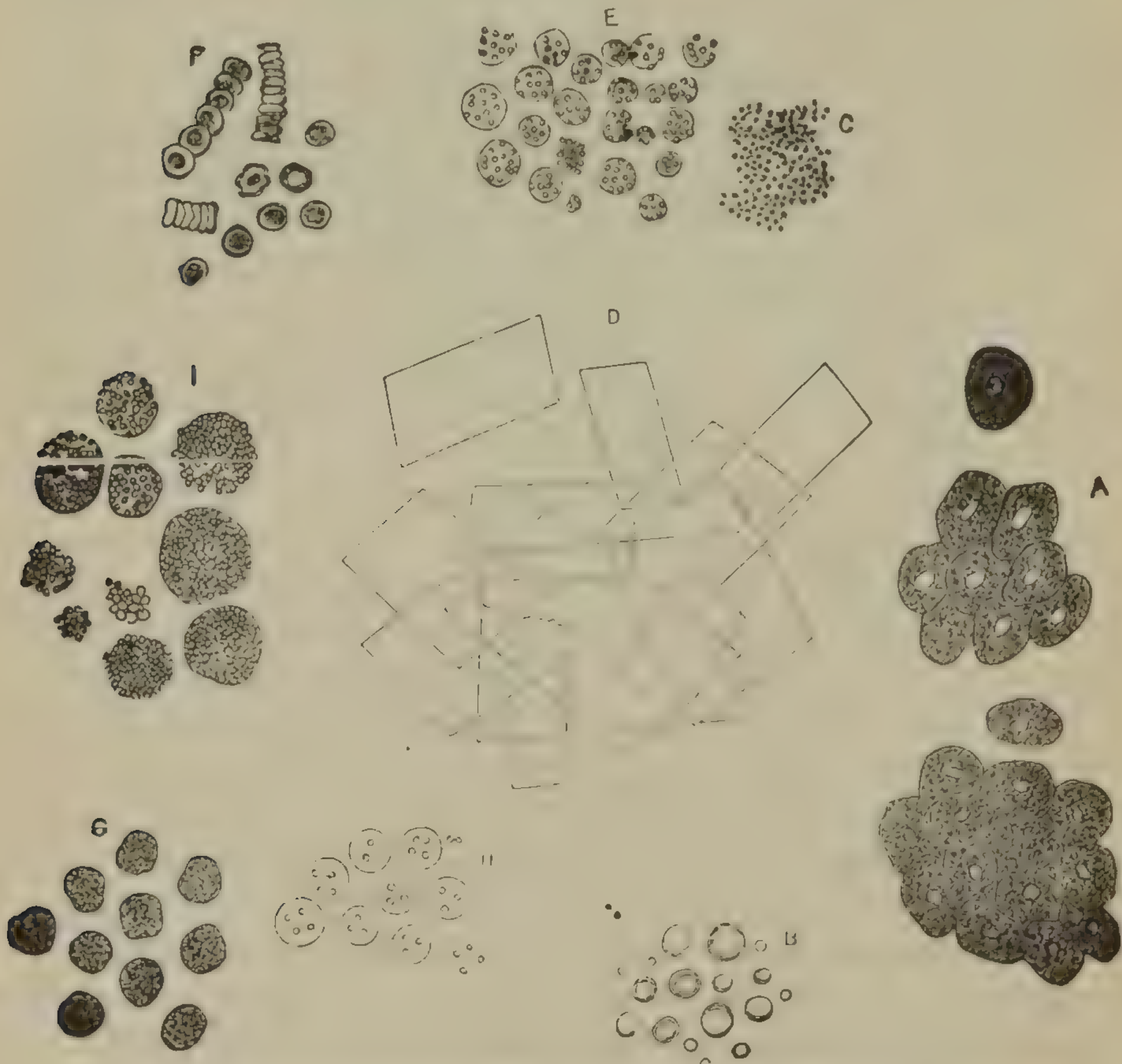
Ovarian cysts consist of the tumor and its pedicle. These cysts are always multiple and the pedicle is usually formed of the ovarian and broad ligament with the oviduct, the whole structure being covered by the peritoneal investment. The walls of the cyst are composed of condensed connective tissue lined with columnar epithelium. In the *glandular form of cystic tumor* this epithelium grows outward and forms occluded follicles in the cyst wall, in which again other follicles may develop. In the *papillary form*, on the other hand, the connective tissue itself grows out, pushing the linings of the cyst before it, and the papillæ thus formed are covered by the epithelium of the cyst. *The fluid* which these cysts contain varies greatly in consistence and color. It is usually somewhat viscid, but may be so thick that it will not flow through a canula of large size, being almost glutinous. Its color varies from yellowish to greenish; the specific gravity also varies greatly, probably averaging 1010 to 1112. The fluid contains a large amount of albuminous and mucous matters, and often oil globules, cholesterin, blood and large granular cells. Dr. Drysdale has described a corpuscle which he considers characteristic of ovarian fluids. It is generally round, delicate, transparent, and contains a number of granules but no nucleus. It varies in size from $\frac{1}{5000}$ to $\frac{1}{2000}$ of an inch in diameter. When acetic acid is added to these cells it increases their transparency and renders their granules more distinct, while if it is added to a pus cell or to a mucus cell it increases their size and brings their nuclei into view.

The fluid from parovarian cysts looks like clear water, contains no cells and is little more than a solution of salt.

Malignant disease of the ovaries is sometimes seen complicating

the papillary form of cystic degeneration. Occasionally it is a primary disease and may be either of a scirrhous or medullary variety. In case of malignant degeneration of the ovary there is rapid formation of ascitic fluid in the peritoneal cavity and when this is present and cannot be explained by hepatic, cardiac or

FIG. 44.

MICROSCOPIC EXAMINATION OF FLUID FROM OVARIAN TUMORS. (*Byford.*)

renal disease, the probability that the ovarian tumor is of a cancerous nature, is exceedingly strong.

Symptoms and History.—The disease usually begins in one or the other ovary, the second ovary being affected or not, as the case may be. In the early stages there are no symptoms whatever of the disease; as the tumor grows a sensation of weight and

uneasiness, of dragging pain, and of lassitude is gradually developed; the menstrual functions are not interfered with in this stage.

Gradually the patient becomes aware of the presence of something in the abdominal cavity to which she has not been accustomed, but very frequently the tumor will not be recognized until it has attained a large size and has passed over the median line,—in fact it is very rare for the patient to be able to say on which side she first noticed the tumor. The general health now begins to deteriorate, there is often some loss of appetite and the drain on the albumen of the blood causes malnutrition and anæmia producing emaciation and a cachectic appearance. The pressure of the tumor on the veins of the abdomen sometimes occasions œdema of the lower extremities, which is also partly due to the condition of the blood. The patient suffers from shortness of breath owing to the intra-abdominal pressure interfering with the descent of the diaphragm, and cardiac palpitation is frequently produced by pressure of the cyst upon the diaphragm.

The menstrual functions are not interfered with until late in the disease, when the anæmia may become so great that the patient has no blood left wherewith to menstruate. Amenorrhœa may be present also, if the entire ovigenous layer of the ovaries is destroyed by the disease.

These cysts are of slow growth, the average duration of a case being from one to three years, and the patient finally dying from exhaustion due to anæmia, or rupture of the cysts and subsequent peritoneal inflammation, or occasionally from uræmia, due to pressure.

Physical Signs.—The physical signs of small ovarian tumors have already been discussed. When the cyst first begins to grow it usually causes prolapse of the ovary into Douglas's cul-de-sac, where it may be detected by the finger in the vagina. As it increases in size it displaces the uterus forward, and finally as it enlarges rises out of Douglas's cul-de-sac and passes forward to the anterior abdominal wall, now causing backward displacement of the uterus.

On inspection, when the patient lies on her back and the abdominal surface is exposed, it is seen to be greatly distended, the superficial abdominal veins are markedly dilated, and linea albi-

cantes are usually present. The distention may be uniform, but is generally more marked laterally.

Mensuration shows the distance from the anterior superior iliac spine to the umbilicus is greater on one side than on the other.

On palpation fluctuation is detected. There is never any muscular contraction felt in the cyst wall, a point which aids the diagnosis from pregnancy. The mass in the abdominal cavity feels like an encysted collection of fluid, and the fluctuation-wave usually varies according as the fluid is more or less dense.

On percussion, when the patient lies on her back, a dull note is obtained over the tumor, while on either side there is a clear tympanitic note, owing to the displacement of the intestines by the cyst. The area of dullness does not change in situation when the patient changes her position, a point of much importance, indicating that the fluid is encysted.

Auscultation.—No sound is heard upon listening over the abdomen, except, perhaps, a peritoneal friction sound.

On vaginal examination the uterus is felt of normal size and weight, and usually displaced to one or the other side, forward or sometimes backward. The tumor can sometimes be made out on bimanual examination, but does not project into the pelvic cavity.

On rectal examination, if the tumor is elevated through the abdominal walls by the hands of an assistant, and the cervix is drawn down by a volsella-forceps, the examining finger will feel a tense band passing outward from one or the other uterine cornua, and the pulsation of the ovarian artery can usually be distinctly recognized. The other ovary should now be examined to ascertain if it is of normal size.

Differential Diagnosis.—*A small ovarian cyst* may be mistaken for (1) *pelvic cellulitis*, but in these cases the history of inflammation, the absence of distinct fluctuation, even when pus is present, and the firm character of the deposit with its fixation, are very different from the physical signs of a cyst.

(2) *Pelvic peritonitis*. The history of the case is very different, and the examination of the fluid, as has been already stated, will render the diagnosis clear.

(3) *Parovarian cysts* impart a distinct sense of fluctuation to the hand, are not as rounded as ovarian cysts, when tapped do not

recur, and the withdrawn fluid consists simply of salt and water, differing materially from that of ovarian cysts.

(4) *Diseases of the tubes*, as hydro- or pyosalpinx are situated higher in the pelvis than the pedicle, are tortuous, elongated, sausage-like tumors.

(5) *Solid ovarian tumors* are not frequent, and are usually malignant, in which case nodules are found in the fornices.

A large ovarian tumor may be mistaken for—

(1) *Pregnancy*; but in pregnancy the uterus increases more rapidly in size, bimanual examination shows that the tumor is connected with the uterus, the changes in the uterine neck are marked, there is hypertrophy of the vagina which is darker in color, the breasts also increase in size, the nipples are more prominent, the areola is darker, Montgomery's tubercles are enlarged, and the superficial veins of the breast are swollen. On abdominal palpation the parts of the foetus may be felt, intermittent contractions occur in the uterus, and auscultation after four and a half months reveals the existence of the foetal heart beat, the tumor is situated in the median line and the menses are absent.

(2) *Ascitic fluid in the peritoneal cavity*. In this case when the patient lies on her back a dull note will be elicited by percussion over the flanks and at the sides of the abdomen, while there will be a tympanitic note in the median line due to the intestines floating on the surface of the fluid.

On change of position the area of dullness will change, the intestines always rising to the surface of the fluid. The reverse is the case in ovarian tumor.

(3) *Fibro-cystic tumors of the uterus* are very difficult to differentiate from ovarian cysts. They grow more slowly and fluctuation is only felt in parts of the tumor, which is found to vary in consistence. The fluid when drawn off coagulates spontaneously.

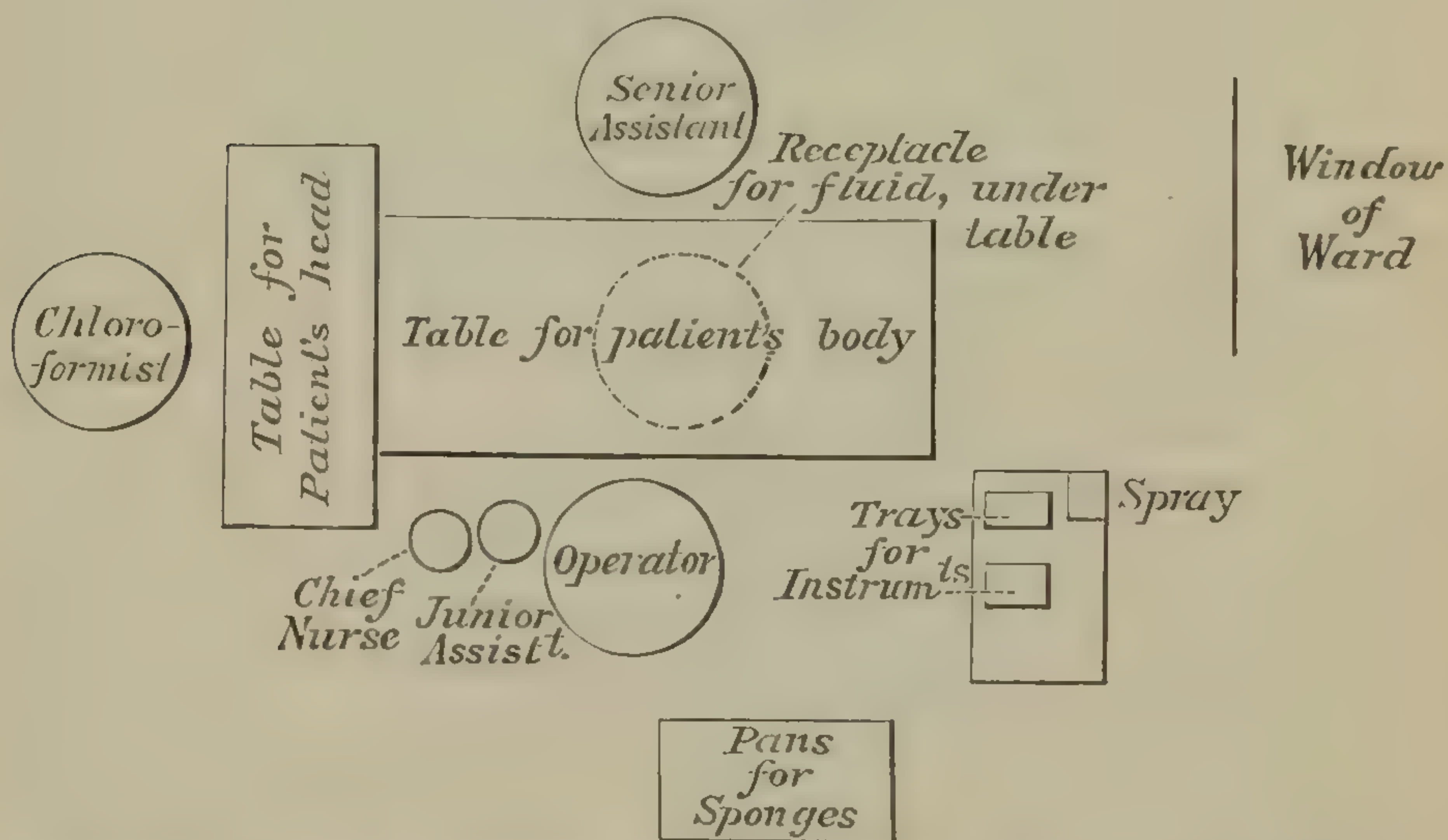
Treatment.—When an ovarian cyst is diagnosed an operation had better be performed at as early a date as possible.

Before the operation the patient's health should be placed in the best possible condition. She should rest for a week or ten days in the place where the operation is to be performed, which had better be a private hospital if possible, and should be given good nourishing food with a small amount of stimulus and iron if she is

anæmic, and have her bowels opened every day by means of an enema or purgative if necessary.

The room in which the patient is to be confined after the operation should be large, well ventilated, and with a moderately high ceiling, well lighted by several windows, and have the bed so placed that she will not be subjected to any draught from doors or windows. There should be no carpet on the floor and not too much furniture. It must be well ventilated and disinfected prior to the operation. It is better to perform the operation in another room, which should

FIG. 45.



POSITION OF TABLES, OPERATOR, ASSISTANTS, ETC., DURING OVARIOTOMY.

be lighted if possible from above, should have little furniture besides the operation table and a stand for instruments, and must be thoroughly scrubbed with disinfectants on the day prior to the operation. On the morning of the operation the patient should have nothing to eat, and must have had her bowels moved by a purgative administered the night before. She should be dressed as if for bed and wear also during the operation a short flannel dressing gown, and a pair of warm stockings. She had better be etherized in an adjoining room, and not brought into the operating room until thoroughly unconscious.

The operating room, instruments and sponges must in the meantime have been prepared.

Five or six assistants are necessary, as are also the following instruments:—

1. A water-proof sheet for the abdomen.
2. Two trays for instruments, two bowls for sponges.
3. Two stout scalpels, with steel handles.
4. Two dozen Keith's pressure forceps.
5. A long groove director for dividing the perinæum.
6. Scissors curved in the flat.
7. An ovariectomy trocar and canula, with tubing. It should be of large size.
8. Nélaton's volsella, and several plain volsella-forceps.
9. A large strong pair of pressure forceps for compressing the pedicle.
10. Several pairs of artery forceps.
11. Pedicle needle with handle.
12. Long pedicle needle without handle, having a large eye.
13. Nos. $\frac{1}{2}$, 1, 2, 3, 4, Chinese twist silk.
14. Medium sized catgut.
15. Sponge-holders.
16. Needle-holder.
17. Needles.
18. Two dozen sponges, two of which should be large and flat and two small and flat.
19. Strapping, iodoform gauze, and woollen pad.
20. Piece of mackintosh rubber cloth a foot square.
21. Many-tailed abdominal bandage.
22. Three or four perforated glass drainage tubes of different length.
23. Anæsthetic, brandy, morphine, atropine, hypodermic syringe, and rubber syringe with long nozzle for sucking up fluids through the drainage tube from the bottom of Douglas's cul-de-sac.

In addition to all this a Paquelin's thermo-cautery and two large mackintosh aprons, which will cover the operator and his first assistant entirely, leaving the arms free, are desirable. The instruments should be boiled in water in order to thoroughly disinfect them, and should then be placed in a solution of creolin or carbolic

acid until they are needed. The sponges should be thoroughly boiled and antisepticized, as should also the towels which are to be used in the operation. After the patient is fully etherized she is brought into the room and placed on the operating table, lying on her back; her buttocks must be elevated and her clothes well drawn up above the loins; a blanket should be wrapped around each leg and pinned. The abdomen should be thoroughly washed with an antiseptic solution, and the pubic hair partly shaved off; the assistants should thoroughly disinfect their hands and arms, and the instruments, sponges and assistants occupy the position indicated in the figure. The steps of the operation may be tabulated as follows:—

1. Placing the patient on the table.
2. The abdominal incision.
3. Examining the surface of the cyst and tapping of the cyst.
4. Extracting the collapsed cyst and managing the adhesions.
5. Ligation and division of the pedicle.
6. Examination of the opposite ovary.
7. Toilet of the peritoneum.
8. Introduction of sutures.
9. Counting the sponges, forceps and instruments.
10. Closing the abdominal wound.
11. Application of dressings.
12. Putting the patient to bed.

Details of the Operation.—The abdominal incision is made with a scalpel, through the integuments in the middle line of the abdomen, beginning about three inches below the umbilicus and continuing downward for about three inches, the bladder having previously been emptied by a catheter.

The first assistant sponges the wound as it is made, by gentle pressure against the bleeding vessels, which are then secured by Keith's pressure forceps, allowed to remain in place. The structures are now divided down to the peritoneum, and when all bleeding has been checked that membrane should be gently raised and divided upon a grooved director, or better, as soon as the opening is sufficiently large, on two fingers of the operator placed within its cavity, when the shiny white surface of the ovarian cyst is exposed. When the surgeon has assured himself that the tumor

which bulges through the abdominal incision is a multilocular, dermoid or broad ligament cyst and not an impregnated uterus, fibrocyst or other tumor of the uterus or neighboring part, the trocar should be thrust into the cyst, the sides of the abdomen supported by the assistant and the intestines prevented from escaping by a sponge in the hands of the first assistant. After the contents of the large cysts have thus been evacuated, the secondary cysts must be broken down by the hands of the operator plunged into the cyst cavity, after which the tumor can usually be turned out of the abdomen, provided no adhesions exist.

If adhesions are present they may be broken down by steady gentle pressure of the sponge, if they are soft parietal adhesions. If it is adherent to the omentum, they must be carefully tied with fine silk in two places and divided between the ligatures. Adhesions to the intestine must be very carefully separated. If the cyst wall is strong and adherent, it is best to cut it away, leaving a small portion of it. The cyst is now drawn out of the abdominal wound and the pedicle examined. The vessels having been carefully pushed outward, the pedicle is transfixed with a stout, silk double ligature inserted carefully by means of a pedicle needle, care being taken that no vessel is wounded. The first assistant catches the loop of silk as soon as it appears and draws it through the pedicle while the operator withdraws the needle; the loop is now cut through, the operator and assistant ascertain to which thread the end belongs and the operator carefully twists the end of the thread intended for the outer loop around the remaining thread, after which the two ends of one thread are firmly tied on the outer side of the pedicle and the ends of the remaining thread tied around the other side. If the pedicle is very broad a second or third transfixion may be necessary, taking care in tying them that the threads occupy the groove already formed by the first ligature. Two pairs of pressure forceps are now applied to the outer border of the distal side of the pedicle about half an inch from the groove formed by threads. The pedicle is now cut across by scissors about an inch beyond the groove, the tumor being supported by an assistant to prevent its dragging or tearing itself off when partly divided. The intestines may be kept in place by means of a large flat sponge pushed into the peritoneal cavity, and the pedicle

having been thoroughly examined to see that no hemorrhage occurs, the second ovary should be explored by means of two fingers, and if diseased should be removed in a similar manner. The forceps having been removed from the pedicle and the stump dropped back into the peritoneal cavity after having been thoroughly sponged, the toilet of the peritoneum should be attended to. This consists in douching thoroughly the entire peritoneal cavity by means of a fountain syringe, using boiled water or a disinfectant solution, and continuing the douching until the water runs out of the abdominal wound perfectly clear. Sponges are now to be inserted on a sponge holder into the bottom of Douglas's cul-de-sac until they come as dry as when put in. After which the sutures should be introduced, the intestines being protected by the large flat sponge already mentioned.

The instruments and sponges must now be carefully counted, to make sure that none have been left in the peritoneal cavity.

Operators differ in the manner in which they introduce the sutures. Some suture the peritoneum separately, and others unite the peritoneum and abdominal wound with the same sutures; some use ligatures armed with two needles, one at either end, and insert them on either side from the peritoneal cavity outward through the abdominal tissues, others pass the sutures from the integuments inward through the peritoneum, across the wound, and out through the opposite side. However they are introduced they should be applied to the upper end of the wound first, should be placed about a quarter of an inch from the margin of the wound, and about half an inch apart. When all the sutures are in place the large flat sponge should be withdrawn and a sponge passed into Douglas's cul-de-sac to see if any fluid has accumulated in that situation, and if it has, sponges should be introduced one after another until they come out dry. The omentum is now examined, to see if it has been injured, and afterward spread over the intestines. The sponges should again be counted, and if none are missing, the wound may be closed. The upper suture is at first drawn just firmly enough to bring the margins of skin in apposition without any tension or puckering; this suture is then tied in a surgeon's knot, and the remaining sutures are secured in the same way, the wound being sponged before each thread is tightened.

If there has been much oozing, a drainage tube had better be inserted in the lower angle of the wound before the sutures are tightened. It should consist of glass, and be long enough to reach the bottom of Douglas's cul-de-sac. A minute hole should be made in a sheet of rubber cloth about a foot square, through which the drainage tube should be pushed; on the top of the drainage tube absorbent cotton is placed, and the ends of the rubber cloth brought together over it and tied; in this way the dressings and surface of the wound are protected from any fluid which may escape from the drainage tube. Various antiseptic dressings are now applied to the wound; it may be dusted with iodoform and covered with antisepticized absorbent cotton, or it may be dressed with six or eight layers of wet sublimated gauze. This cotton is held in place by means of adhesive strips, and if the abdominal walls are relaxed, layers of cotton-wool are placed over the dressing so as to fill up the hollow; a many-tailed flannel bandage neatly applied and made fast by safety pins completes the dressing. When a drainage tube has been inserted, after the lapse of a few hours the rubber cloth should be untied, the cotton covering the mouth of the tube removed, and the fluid sucked up from its interior by means of a long-nozzled syringe, care being taken that the nozzle of the syringe shall not pass entirely into Douglas's cul-de-sac, as it might then suck in some of the tissues. A dressing of this sort, if it remains sweet and clean, may be left in place for a week or ten days. After the wound is dressed the woman is put to bed, a pillow put under her knees and teaspoonful doses of very hot water administered if there is any vomiting from the ether. No food should be given by the mouth for the first twenty-four hours, after which milk and soda water, or seltzer, small amounts of beef tea, and if the patient is feeble nutritive enemata may be administered. The diet is gradually increased until it finally attains its customary proportions, but no solid food should be given by the mouth until after the escape of flatus from the bowels. Opium should only be administered if indicated by pain. The water should be drawn off three times a day for several days, and the bowels, if not previously opened, should be moved at the end of a week by injection of warm sweet oil. The stitches are removed

on the eighth day, after which the wound should be dressed with great care and an abdominal belt worn to prevent formation of a hernia.

DISEASES OF THE PELVIC PERITONEUM AND CONNECTIVE TISSUE.

PELVIC CELLULITIS AND PELVIC PERITONITIS.

It is a rare event to see a case of marked pelvic cellulitis in which the peritoneum is entirely exempt from inflammation, and, on the other hand, the cellular tissue of the pelvis shares in the inflammation when the pelvic peritoneum is inflamed. On this account it has seemed best to consider the two affections side by side, and in the same chapter, rather than describe them as distinct affections, which, pathologically speaking, they are.

Pelvic peritonitis is also called pelveo-peritonitis and perimetritis; pelvic cellulitis is known as parametritis.

The former is an acute or chronic inflammation affecting the pelvic peritoneum chiefly, while the latter is an acute or chronic inflammatory condition of the connective tissue of the pelvis, which often terminates in suppuration.

Causes.—The most frequent cause is spread of inflammation from surrounding structures, as from the cellular tissue. Intra-peritoneal growths, as fibroid or ovarian tumors, will not infrequently set up a pelvic peritonitis.

The accidents accompanying parturition or abortion are also often associated with pelvic inflammation.

Gonorrhœa in the female, or latent gonorrhœa in a husband are also causative agents. Many cases arise at the menstrual period, due to the congestion which invariably accompanies this act. Venereal excesses also produce pelvic inflammation. Mechanical causes, as instrumental examination, occasionally the introduction of a sound, stem pessaries, tents, etc., favor its development.

Pelvic cellulitis often arises in the puerperal condition from the

introduction of septic material gaining access through an abrasion or wound and invading the lymph channels. It may also arise from any of the causes which produce pelvic peritonitis.

Symptoms.—*Of acute peritonitis.*

The symptoms are those of fever usually preceded by a chill, and accompanied by very severe shooting pain increased on urination and defecation.

Of cellulitis.

The symptoms are the same, but the pain is not so severe.

Physical Signs.—*In pelvic peritonitis* the patient usually lies on her back with both her thighs drawn up in order to relax the abdominal muscles, which are found on palpation to be rigid, the slightest touch causing great pain.

On indagation the vagina feels hot and tender, and its vessels pulsate.

When exudation occurs the vaginal vault feels hard, very much as if plaster-of-Paris had been poured into the pelvis above it.

A bulging tumor is found behind the cervix in the posterior vaginal walls, often extending down for some distance along the posterior wall, and due to encysted fluid in Douglas's cul-de-sac.

It is sensitive to the touch, and as absorption takes place it becomes nodulated from extension of the inflammatory condition to the connective tissue. Sometimes the serous effusion is encysted behind the broad ligament, causing slight bulging with a feeling of tension in the neighborhood of the broad ligaments.

Bimanual examination is usually impossible; sometimes an exudation is found in the neighborhood of the bladder, hard and painful to the touch.

In pelvic cellulitis palpation reveals nothing more than in pelvic peritonitis. Bimanual examination is difficult, and after exudation occurs, a bulging tumor is found at the side of the uterus projecting into the vaginal fornix, displacing the womb laterally; occasionally the tumor is behind the uterus and very rarely between the uterus and bladder. A hard mass of exudation is felt in the iliac fossa and can sometimes be detected in the upper portion of the broad ligament.

If suppuration results, these hard exudations become softer and boggy, and perhaps a vague fluctuation may be detected.

Termination.—*In pelvic peritonitis* the case usually terminates with recovery and the inflammatory action gradually abates.

Adhesions may form, binding the uterus, ovaries or oviducts to adjacent structures and giving trouble in after life.

The peritonitis occasionally becomes general, and is then often fatal. Suppuration may occur, and the pus may perforate the bladder, vagina or rectum.

In pelvic cellulitis the attack usually passes off leaving no trace behind it, or an abscess may form which may open externally or perforate one of the viscera. Occasionally it opens into the peritoneal cavity.

There is always a liability for the attack to recur at one or two successive menstrual periods.

The Diagnosis of *pelvic inflammation* is easy; but it is often hard to differentiate between the two affections just described, especially as in a marked case of one variety the other is always present.

Treatment.—*Prophylactic.*—Thorough antisepsis should be practiced during all operations on the female genitalia.

Patients who are liable to attacks of pelvic inflammation must be exceedingly careful during their menstrual period, avoiding exposure to cold and all undue excitement.

A patient who has the remains of a peritoneal or cellulitic exudation should be handled with the greatest care during an examination, and neither the sound nor any application introduced into the cavity of the womb until all trace of the inflammation has disappeared.

Gonorrhœa should be most thoroughly treated both in the patient and her husband.

General Treatment.—The diet should be light, consisting of iced milk and lime water. As the inflammation progresses and the patient becomes weak, a nourishing, but easily digested diet, even somewhat stimulating in character, should be given every few hours, as in fevers. Alcohol is necessary in this stage.

The bowels should be regulated by compound liquorice powder, castor oil or small and repeated doses of the salines. Opium should be given for the pain, and iron, quinine and digitalis administered as required.

Locally, large flaxseed poultices should be applied over the abdomen when not objectionable from their weight. In other cases, turpentine stupes or turpentine and laudanum alternately or hot vaginal injections often give relief.

If suppuration occur, the treatment must be of a supportive character, and the pus should be evacuated—either through the vagina or by a laparotomy, thorough antiseptic precautions being taken.

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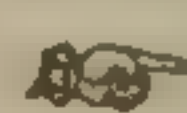
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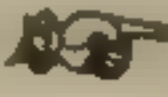
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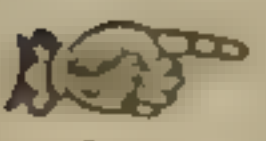
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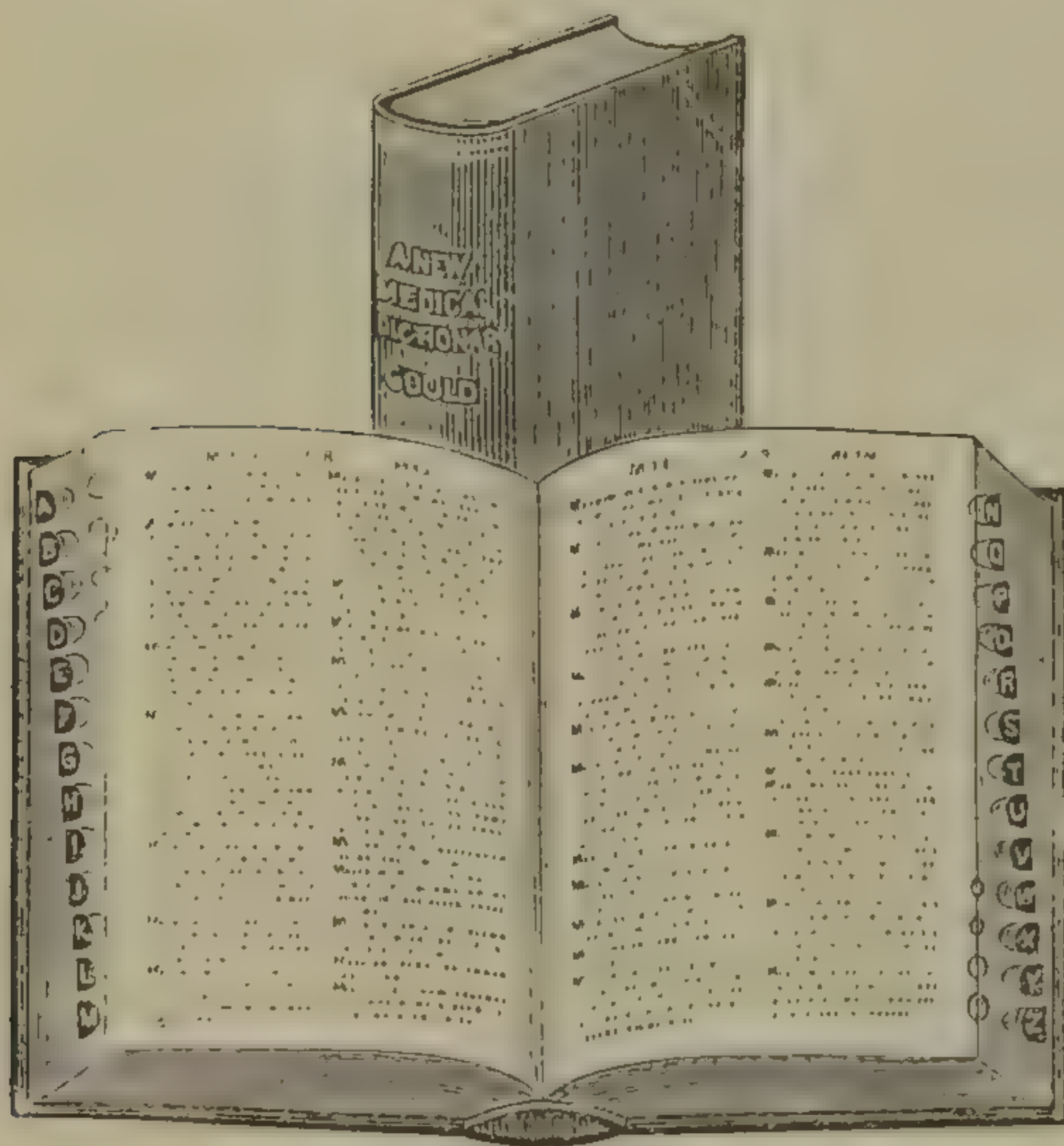
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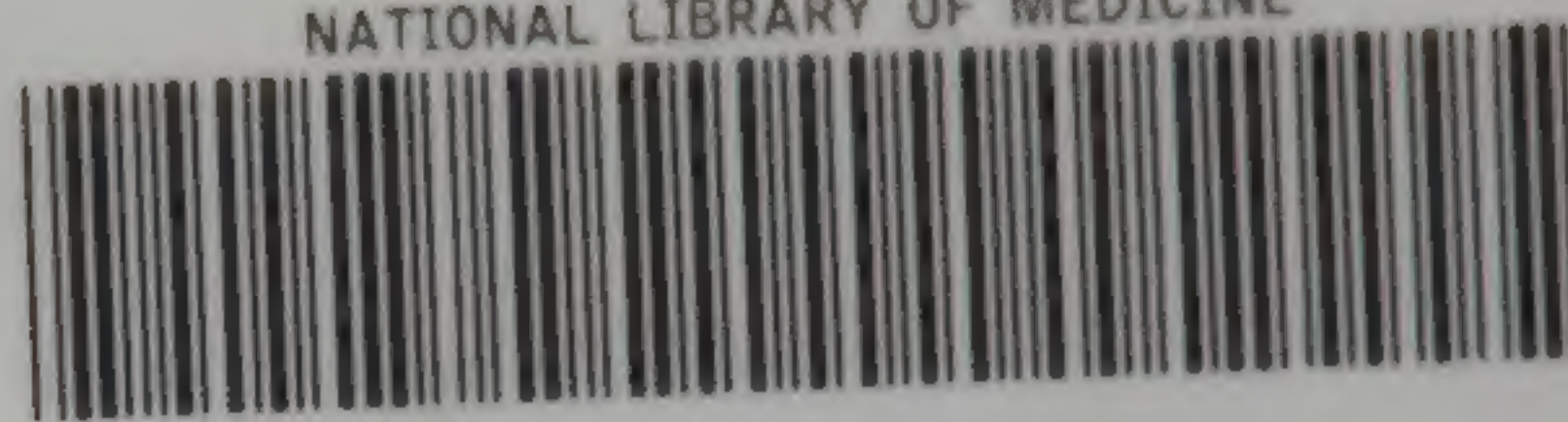
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